

SUPPLEMENTAL WATERSHED PLAN-ENVIRONMENTAL ASSESSMENT
For the
SANDSTONE CREEK WATERSHED

A supplement to the original watershed plan for rehabilitation of floodwater retarding structures
No.12 and No.17A
Roger Mills County, Oklahoma

April 2002

SANDSTONE CREEK WATERSHED

Supplemental Watershed Agreement No. 3
For Floodwater Retarding Structures (FWRS) No.12 and No.17A

Between the

Upper Washita Conservation District
Roger Mills County
North Fork of the Red River Conservation District
Beckham County
(Referred to herein as sponsors)
Board of County Commissioners for Roger Mills County
(Referred to herein as co-sponsors)
State of Oklahoma

And the

Natural Resources Conservation Service
(Referred to herein as NRCS)
United States Department of Agriculture

Whereas, the watershed plan for the Sandstone Creek Watershed, a subwatershed of the Washita River Watershed, executed by the sponsors named therein and the Soil Conservation Service (SCS, now NRCS), became effective in 1949 and later revised on October 10, 1951; and

Whereas, in order to extend the watershed plan for said FWRS No.12 and No.17A beyond their evaluated life, it has become necessary to modify said watershed agreement; and

Whereas, the rehabilitation of said FWRS No.12 and No.17A has been authorized under the authority of Public Law 106-472, the Small Watershed Rehabilitation Amendments of 2000, which amends Public Law 83-566, the Watershed Protection and Flood Prevention Act; and

Whereas, the responsibility for administration of the Flood Prevention Program authorized by the Flood Control Act of 1944, as amended, and the Watershed Protection and Flood Prevention Act, as amended, has been assigned by the Secretary of Agriculture to the NRCS; and

Whereas, there has been developed through cooperative efforts of the sponsors and NRCS a supplemental plan for works of improvement for FWRS No.12 and No.17A of the Sandstone Creek Watershed, State of Oklahoma, which plan is annexed to and made part of this agreement;

Now, therefore, in view of the foregoing considerations, the Secretary of Agriculture, through NRCS and the sponsors hereby agree on this supplemental plan and that the works of improvement for this project will be installed, operated, and maintained in accordance with the terms, conditions, and stipulations provided for in this supplemental watershed agreement and including the following:

1. The North Fork of the Red River Conservation District is dropped as a sponsor for the rehabilitation of Sandstone Creek sites 12 and 17A and will have no responsibilities for this new project.

2. The Board of County Commissioners for Roger Mills County is added as a co-sponsor to establish a floodplain board, which shall adopt, administer and enforce floodplain management regulations under Title 82 of Oklahoma Statutes, 1980, for the purpose of the delineation of floodplains and floodways; the preservation of the capacity of the floodplain to carry and discharge regional floods; the minimization of flood hazards; and the regulation of the use of land in the floodplain. The regulations shall be based on adequate technical data and competent engineering advice; dam breach impact maps will be provided by NRCS.

3. The sponsors agree to participate in and comply with applicable federal flood plain management and flood insurance programs. This includes working with local units of government to zone the designated 100-year floodplain, special flood hazard areas, and the designated floodways as defined in the Official Flood Studies. The sponsors also agree to work with Roger Mills County, State of Oklahoma to zone the potential impact areas as defined in the Official Breach Inundation Studies for all the sites in this plan. The potential impact areas are the areas that would be affected by a sudden breach of the dam as outlined in Appendix B: Breach Inundation Maps For Sites 12 and 17A. Floodplain zoning will prohibit new construction of houses, mobile homes, or businesses in the potential impact area for the life of the project, or 100 years, which ever is greater. Floodplain zoning will be enacted prior to plan implementation.

Floodplain studies and breach inundation studies are not official unless specifically adopted by Roger Mills County, State of Oklahoma (for all unincorporated areas of the county) or the Town of Cheyenne, Oklahoma (for all areas within the corporate limits of Cheyenne, Oklahoma).

4. The sponsors will acquire all land rights, easements, or right-of-ways and pay all relocation costs as will be needed in connection with the works of improvement. Estimated cost is \$33,600.

5. The sponsors hereby agree that they will comply with all of the policies and procedures of the Uniform Relocation Assistance and Real Property Acquisition Policies Act (42 U.S.C. 4601 et.seq. as implemented by 7 C.F.R. Part 21) when acquiring real property interests for this federally assisted project. If the sponsor is legally unable to comply with the real property acquisition requirements of the Act, it agrees that, before any federal financial assistance is furnished, it will provide a statement to that effect, supported by an opinion of the chief legal officer of the state containing a full discussion of the facts and law involved. This statement may be accepted as constituting compliance. In any event, the sponsor agrees that it will reimburse owners for necessary expenses as specified in 7 C.F.R. 21.1006 (c) and 21.1007.

6. The sponsors will be responsible for the costs of water, mineral, and other resource rights and will acquire or provide assurance that landowners or resource users have acquired such rights pursuant to state law as may be needed in the installation and operation of the works of improvement.
7. The sponsors will obtain all necessary federal, state, and local permits required by law, ordinance, or regulation for installation of the works of improvement.
8. The percentages of total rehabilitation project costs to be paid by the sponsors and by NRCS are as follows:

<u>Works of Improvement</u>	<u>Sponsors</u> 35%	<u>NRCS</u> 65%¹	<u>Estimated Project Costs</u>
Rehabilitation of FWRS 12 and 17A	\$142,400	\$264,500	\$406,900

Total project costs include construction, land rights, relocation, project administration, and engineering services provided by the sponsors. Not included is technical assistance provided by NRCS or cost of permitting and ordinances.

9. The sponsors will obtain conservation plan agreements from owners of not less than 50 percent of the drainage area above each floodwater retarding structure. These agreements state that the owners will carry out conservation farm or ranch plans on their land and ensure that 50 percent of the land is adequately protected before rehabilitation of any floodwater retarding structure.
10. The sponsors will be responsible for the operation, maintenance, and replacement of the works of improvement by actually performing the work or arranging for such work, in accordance with agreements to be entered into before issuing invitations to bid for construction work.
11. The costs shown in this agreement are preliminary estimates. Final costs to be paid by the parties hereto will be based on the actual costs incurred in the installation of works of improvement and the cost-share percentages stated in this agreement.
12. This agreement is not a fund-obligating document. Financial and other assistance to be furnished by NRCS in carrying out the Rehabilitation Plan is contingent upon the fulfillment of applicable laws and regulations (and the availability of appropriations for this purpose).
13. This agreement does not commit the NRCS to assistance of any kind beyond the 100-year project life.

¹Maximum allowable by law is 65% of the total project costs, not to exceed 100% of the construction costs.

14. A separate agreement will be entered into between NRCS and the sponsors before either party initiates work involving funds of the other party. Such agreements will set forth in detail the financial and working arrangements and other conditions that are applicable to the specific works of improvement.

15. This Rehabilitation Plan may be amended or revised only by mutual agreement of the parties hereto, except that NRCS may de-authorize or terminate funding at any time it determines that the sponsors have failed to comply with the conditions of this agreement. In this case, NRCS shall promptly notify the sponsors in writing of the determination and the reasons for the de-authorization of project funding, together with the effective date. Payments made to the sponsors or recoveries by NRCS shall be in accord with the legal rights and liabilities of the parties when project funding has been de-authorized. An amendment to incorporate changes affecting a specific measure may be made by mutual agreement between NRCS and the sponsors having specific responsibilities for the measure involved.

16. No member of or delegate to Congress, or resident commissioner, shall be admitted to any share or part of this plan, or to any benefit that may arise therefrom; but this provision shall not be construed to extend to this agreement if made with a corporation for its general benefit.

17. Activities conducted under this agreement will be in compliance with the nondiscrimination provisions as contained in the Titles VI and VII of the Civil Rights Act of 1964, as amended, the Civil Rights Restoration Act of 1987 (Public Law 100-259) and other nondiscrimination statutes, namely Section 504 of the Rehabilitation Act of 1973, Title IX of the Education Amendments of 1972, the Age Discrimination Act of 1975, and in accordance with regulations of the Secretary of Agriculture (DR43003). The U.S. Department of Agriculture (USDA) prohibits discrimination in all its programs and activities on the basis of race, color, national origin, gender, religion, age, disability, political beliefs, sexual orientation, and marital or family status. (Not all prohibited bases apply to all programs.) Persons with disabilities who require alternative means for communication of program information (Braille, large print, audio tape, etc.) should contact USDA's TARGET Center at (202) 720-2600 (voice and TDD).

To file a complaint of discrimination, write USDA, Director, Office of Civil Rights, Room 326W, Whitten Building, 14th and Independence Avenue, SW, Washington, DC 20250-9410 or call (202) 720-5964 (voice or TDD). USDA is an equal opportunity provider and employer.

18. Certification Regarding Drug-Free Workplace Requirements
(7CFT 3017, Subpart F).

By signing this watershed agreement, the sponsors are providing the certification set out below. If it is later determined that the sponsors knowingly rendered a false certification, or otherwise violated the requirements of the Drug-Free Workplace Act, the NRCS, in addition to any other remedies available to the Federal Government, may take action authorized under the Drug-Free Workplace Act.

Controlled substance means a controlled substance in Schedules I through V of the Controlled Substances Act (21 U.S.C. 812) and as further defined by regulation (21 CFT 1308.11 through 1308.15);

Conviction means a finding of (including a plea of nolo contendere) or imposition of sentence, or both, by any judicial body charged with the responsibility to determine violations of the Federal or State criminal drug statutes;

Criminal drug statute means a Federal or non-Federal criminal statute involving the manufacturing, distribution, dispensing, use, or possession of any controlled substance;

Employee means the employee of a grantee directly engaged in the performance of work under a grant, including: (i) all direct charge employees; (ii) all indirect charge employees unless their impact or involvement is insignificant to the performance of the grant; and (iii) temporary personnel and consultants who are directly engaged in the performance or work under the grant and who are on the grantee's payroll. This definition does not include workers not on the payroll of the grantee (e.g., volunteers, even if used to meet a matching requirement; consultants or independent contractors not on the grantees' payroll; or employees of sub-recipients or subcontractors in covered workplaces).

A. The sponsors certify that they will or will continue to provide a drug-free workplace by:

(1) Publishing a statement notifying employees that the unlawful manufacture, distribution, dispensing, possession, or use of a controlled substance is prohibited in the grantee's workplace and specifying the actions that will be taken against employees for violation of such prohibition;

(2) Establishing an ongoing drug-free awareness program to inform employees about --

(a) The danger of drug abuse in the workplace;

(b) The grantee's policy of maintaining a drug-free workplace;

(c) Any available drug counseling, rehabilitation, and employee assistance programs; and

(d) The penalties that may be imposed upon employees for drug abuse violations occurring in the workplace.

(3) Making it a requirement that each employee to be engaged in the performance of the grant be given a copy of the statement required by paragraph (1);

(4) Notifying the employee in the statement required by paragraph (1) that, as a condition of employment under the grant, the employee will --

(a) Abide by the terms of the statement; and

(b) Notify the employer in writing of his or her conviction for a violation of a criminal drug statute occurring in the workplace no later than five calendar days after such conviction.

(5) Notifying the NRCS in writing, within ten calendar days after receiving notice under paragraph (4) (b) from an employee or otherwise receiving actual notice of such conviction. Employers of convicted employees must provide notice, including position title, to every grant officer or other designee on whose grant activity the convicted employee was working, unless the Federal agency has designated a central point for the

receipt of such notices. Notice shall include the identification number(s) of each affected grant;

(6) Taking one of the following actions, within 30 calendar days of receiving notice under paragraph (4) (b), with respect to any employee who is so convicted--

(a) Taking appropriate personnel action against such an employee, up to and including termination, consistent with the requirements of the Rehabilitation Act of 1973, as amended; or

(b) Requiring such employee to participate satisfactorily in a drug abuse assistance or rehabilitation program approved for such purposes by a Federal, State, or local health, law enforcement, or other appropriate agency.

(7) Making a good faith effort to continue to maintain a drug-free workplace through implementation of paragraphs (1), (2), (3), (4), (5), and (6)

B. The sponsors may provide a list of the site(s) for the performance or work done in connection with a specific project or other agreement.

C. Agencies shall keep the original of all disclosure reports in the official files of the agency.

19. Certification Regarding Lobbying (7 CFR 3018)
(applicable if this agreement exceeds \$100,000).

A. The sponsors certify to the best of their knowledge and belief, that:

(1) No Federal appropriated funds have been paid or will be paid, by or on behalf of the sponsors, to any person for influencing or attempting to influence an officer or employee of an agency, Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with the awarding of any Federal contract, the making of any Federal grant, the making of any Federal loan, the entering into of any cooperative agreement, and the extension, continuation, renewal, amendment, or modification of any Federal contract, grant, loan, or cooperative agreement.

(2) If any funds other than Federal appropriated funds have been paid or will be paid to any person for influencing or attempting to influence an officer or employee of any agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with this Federal contract, grant, loan, or cooperative agreement, the undersigned shall complete and submit Standard Form - LLL, "Disclosure Form to Report Lobbying," in accordance with its instructions.

(3) The sponsors shall require that the language of this certification be included in the award documents for all sub-awards at all tiers (including subcontracts, sub-grants, and contracts under grants, loans, and cooperative agreements) and that all sub-recipients shall certify and disclose accordingly.

B. This certification is a material representation of fact upon which reliance was placed when this transaction was made or entered into. Submission of this certification is a prerequisite for making or entering into this transaction imposed by Section 1352, Title 31, U.S. Code. Any person who fails to file the required certification shall be subject to a civil penalty of not less than \$10,000 and not more than \$100,000 for each such failure.

20. Certification Regarding Debarment, Suspension, and Other Responsibility Matters - Primary Covered Transactions (7 CFR 3017).

A. The sponsors certify to the best of their knowledge and belief, that they and their principals:

(1) Are not presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from covered transactions by any Federal department or agency.

(2) Have not within a three-year period preceding this proposal been convicted of or had a civil judgment rendered against them for commission of fraud or a criminal offense in connection with obtaining, attempting to obtain, or performing a public (Federal, State, or local) transaction or contract under a public transaction; violation of Federal or State antitrust statutes or commission of embezzlement, theft, forgery, bribery, falsification or destruction of records, making false statements, or receiving stolen property;

(3) Are not presently indicted for or otherwise criminally or civilly charged by a governmental entity (Federal, State or local) with commission of any of the offenses enumerated in paragraph (1)(b) of this certification; and

(4) Have not within a three-year period preceding this application/proposal had one or more public transactions (Federal, State, or local) terminated for cause of default.

B. Where the primary sponsors are unable to certify to any of the statements in this certification, such prospective participant shall attach an explanation to this agreement.

Upper Washita Conservation District

BY _____

Title _____

Address Zip Code

Date _____

The signing of this supplemental watershed agreement was authorized by a resolution of governing body of the Upper Washita Conservation District adopted at a meeting held on _____ (Date).

Secretary Address Zip Code**North Fork of the Red River Conservation District**

BY _____

Title _____

Address Zip Code

Date _____

The signing of this supplemental watershed agreement was authorized by a resolution of governing body of the North Fork of the Red River Conservation District adopted at a meeting held on _____ (date).

Secretary Address Zip Code**Board of County Commissioners
Roger Mills County**

BY _____

Title _____

Address Zip Code

Date _____

The signing of this supplemental agreement was authorized by a resolution of governing body of the Board of County Commissioners, Roger Mills County, Oklahoma, adopted at a meeting held on _____ (Date).

Secretary Address Zip Code**Natural Resources Conservation Service
United States Department of Agriculture**

Approved by:

State Conservationist

Date

**Supplemental Watershed Plan-Environmental Assessment
For the
Sandstone Creek Watershed**

A supplement to the original watershed plan for the rehabilitation
of floodwater retarding structures (FWRS) No.12 and No.17A

Roger Mills County, Oklahoma
April 2002

SPONSORING LOCAL ORGANIZATIONS

Upper Washita Conservation District
Board of County Commissioners for Roger Mills County

AUTHORITY

The original work plan was prepared, and works of improvement have been installed, under the authority of the Flood Control Act of 1944 (Public Law 78-534) as amended. The rehabilitation of FWRS 12 and 17A is authorized under Public Law 106-472, the Small Watershed Rehabilitation Amendments of 2000, which amends Public Law 83-566, the Watershed Protection and Flood Prevention Act.

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Supplemental Watershed Plan – Environmental Assessment For the Sandstone Creek Watershed

Summary of Supplemental Watershed Plan

Project Name: Sandstone Creek Rehabilitation Plan for floodwater retarding structures No. 12 and No. 17A.

County: Roger Mills

State: Oklahoma

Description of recommended plan: Rehabilitation of two aging floodwater retarding structures to meet current design and safety criteria. Includes replacement of deteriorating structural components of the dam, relocation of a mobile home to prevent loss of life, and fencing above the permanent pool for erosion control, water quality improvement, and fish and wildlife habitat and wetland enhancement. Zone floodplain to prohibit future development.

<u>Resource Information:</u>	<u>Watershed</u>	<u>Site 12</u>	<u>Site 17A</u>
Size (drainage area):	65,995 acres	862 acres	532 acres
Land Use:			
Pasture/Range:	63,883 acres	742 acres	523 acres
Cropland:	1,650 acres	106 acres	0 acres
Other:	462 acres	14 acres	9 acres

Land ownership: 100% private

<u>Number of farms:</u>	680 (Roger Mills County)	1 farm	1 farm
Prime farmland:	about 10,000 acres	40 acres	22 acres
Minority farmers:	6 (Roger Mills County)	0	0

Project beneficiary profile: 1999 County population of 3,593 ranked 74th of 77 counties in Oklahoma. Population diversity is 95.6% white, 0.1% black, 0.1% Asian, 4.2% American Indian, and 1.9% claiming Hispanic origin. 1999 PCPI of \$19,839 ranked 30th in Oklahoma and was 86% of the State average \$22,958, and 69% of the national average of \$28,546.

Wetlands:	about 1,065 acres	12.5 acres	6.8 acres
	Type 5 (Palustrine)	Type 5 (Palustrine)	Type 5 (Palustrine)

Flood Plains:	about 4,700 acres	2,083 acres	2,235 acres
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Threatened and Endangered Species: Roger Mills County – the endangered interior least tern (*Sterna antillarum*), whooping crane (*Grus americana*); the threatened bald eagle (*Haliaeetus leucocephalus*), Arkansas River shiner (*Notropis girardi*); both the black-tailed prairie dog

(Cynomys ludovicianus) and the lesser prairie chicken (Tympanuchus pallidicinctus) are listed as candidate species. The project will have no adverse affect on any of the species above.

Summary of Supplemental Watershed Plan - continued

Cultural Resources: Project area surveyed. None identified.

Problem Identification: Deterioration of aging structural components of the dams; potential for loss of life due to mobile home below dam; gully erosion near dam due to livestock traffic; and water quality impairments to downstream Foss Lake and the Washita River, which are on the 303(d) list, due to sedimentation and livestock nutrients.

Alternative plans considered:

1. No Action: Results in continual deterioration of the dams and eventual failure with the potential for loss of life. Return to pre-project levels of flooding or greater. No action is not acceptable to project sponsors.
2. Decommission: Remove a section of each dam down to the valley floor and install a drop structure in each notch to stabilize the remaining embankment and stored sediment. Flood control lost. Relocate mobile home out of the floodplain. Decommissioning is not acceptable to project sponsors.

Project purpose: Continuation of flood prevention for 100 years and prevent loss of life. Rehabilitation of dams will address all identified problems.

Principal project measures: Upgrade 2 dams to meet current design and safety criteria; replace deteriorating principal spillway conduits and towers; relocation of one mobile home below site 17A; fencing the sediment pool for livestock erosion control, water quality improvement, and fish and wildlife habitat and wetland enhancement; installation of a freeze-proof livestock watering tank below site 17A and a gravel access ramp for livestock on site 12; reshape two critically eroding gullies upstream of site 12 and install diversions as needed; and sediment storage for 100 years.

<u>Project costs</u> :	<u>PL 106-472 funds</u>	<u>Other funds</u>	<u>Total</u>
	65%	35%	100%
Structural Measures	\$264,500	\$142,400	\$406,900

Project benefits: Remove potential for loss of life. Up to \$46,900 average annual flood damage reduction benefits. Improved water quality. Enhanced fish and wildlife and wetland habitat.

Environmental values changed or lost: There will be no change in depth of water or surface area of pool on site 12. There will be a 0.5 increase in depth of water and a 0.3 acre increase in surface area of pool on site 17A. Both sediment pools will be fenced to restrict livestock access thereby enhancing fish and wildlife habitat and the development of emergent wetland habitat.

NEED FOR THE SUPPLEMENT

Purpose

To achieve the objectives of the project sponsors, which are to continue to provide flood protection and to reduce the risk of loss of human life.

Need

To address the structural integrity concerns of two aging and deteriorating flood control dams and to meet applicable safety and performance standards.

PROJECT SETTING

Original Project

A plan for flood prevention and watershed protection was completed in 1949 and later revised in 1951. The plan included the construction of 24 single-purpose, low-hazard, class “A” FWRS that were designed for a 50-year life, 18 grade stabilization structures, one mile of channel improvement, and numerous conservation land treatment measures. This early flood prevention project, which is the world’s first completed upstream flood control project, was completed prior to the enactment of the National Historic Preservation Act of 1966 and the National Environmental Policy Act of 1969. The Sandstone Creek Watershed is 1 of 64 subwatersheds in the Washita River Basin, which is 1 of 11 authorized watersheds under PL-534.

Physical Data

The Sandstone Creek Watershed is located in Roger Mills and Beckham Counties and lies within a rectangle formed by the towns of Sayre, Elk City, Hammon, and Cheyenne, Oklahoma. The headwaters of Sandstone Creek originate about two miles east of U.S. Highway 283, 12 miles south of Cheyenne, and flow in a northeasterly direction for about 15 miles, entering the Washita River about eight miles southwest of Hammon. Carrant, Wildcat, and East Fork of Sandstone Creeks are the major tributaries. The watershed has a drainage area of approximately 65,995 acres, or 103 square miles.

FWRS No. 12 and No. 17A are two of twenty-four FWRS that are located in the Sandstone Creek Watershed. FWRS No.12 has a drainage area of 862 acres and FWRS No.17A has a drainage area of 532 acres. Both dams are located in Roger Mills County. Both sub-watersheds contain no named tributaries to the Washita River and all of the tributaries are classified as intermittent streams.

The Sandstone Creek Watershed is in the Washita River/Red River Basins as delineated by the Water Resources Council hydrologic unit number 11130301. It is located in the Central Rolling Red Plains Land Resource Area, which extends north to south over western Oklahoma and into Kansas and Texas. The landscape is characterized by rough broken land and steep-sloped

drainages with narrowly defined floodplains. Gullies are common, resulting from livestock traversing the steep slopes. The upland loamy to sandy soils were formed over sandstones and shales of Permian Age. The land use is nearly entirely rangeland to support the beef industry, with occasional small tracts broken out for winter wheat to supplement livestock feeding operations.

The climate of the sub-watershed is sub-humid and is characterized by hot summers, mild winters, relatively high wind velocities, and wide fluctuations in rainfall. The average temperatures range from about 37 degrees in January to 83 degrees in July, with temperatures over 100 degrees common. The average annual precipitation recorded near Cheyenne is 25.64 inches. The average length of the growing season is 209 days from April 2 to October 28.

Land Use

The land in the Sandstone Creek Watershed is privately owned. There is no federal land in this watershed. Land use throughout the watershed is predominately pasture and range, covering about 63,883 acres or 97 percent of the watershed. The major enterprise is beef production. The primary use of the cropland, which is about 1,650 acres, or 2.5 percent of the watershed, is for growing feed in support of the livestock industry. Site 12 has 742 acres of pasture and rangeland, and 106 acres of cropland. Site 17A has 523 acres of pasture and rangeland and no cropland. Oil and gas production in the area has provided an economic boost to local residents and there are numerous gas wells in the vicinity of both dams. There are few county maintained roads in the watershed. Most of the roads are lease roads constructed and maintained by oil and gas companies. There are few houses in the watershed, as most people have moved into nearby towns.

Economic and Social Data

The Roger Mills population diversity is 95.6 % white, 0.1 % black, 4.2 % American Indian, and 0.1 % Asian. People of Hispanic Origin include 1.9 % of the population. In the 1997 Agricultural Census, there were 680 Farm Operators in Roger Mills County. Of these, there were 604 white males, 70 white females, 4 Hispanic males, 1 Hispanic female, and 1 Indian male.

The population diversity fails to meet the criteria for a disadvantaged community.

Roger Mills County had a population of 3,593 in 1999 and ranked 74th of the 77 counties in Oklahoma. In 1999, the County had a per capita personal income (PCPI) of \$19,839. This PCPI ranked 30th in the State, and was 86 percent of the State average, \$22,958, and only 69 percent of the national average, \$28,546. The 1999 PCPI reflected an increase of 7.1 percent from 1998. The 1998-99 State change was 3.4 percent and the national change was 4.5 percent.

In 1999, Roger Mills County had a total personal income (TPI) of \$71,281,000. This TPI ranked 76th of the 77 counties in the State and accounted for 0.1 percent of the State total. The 1999 TPI reflected an increase of 7.5 percent from 1998. The 1998-99 State change was 4.0 percent and the national change was 5.4 percent. Total personal income (TPI) includes the earnings (wages and salaries, other labor income, proprietors' income); dividends, interest, and rent; and

transfer payments received by the residents of the County. In 1999, earnings were 46.6 percent of TPI; dividends, interest, and rent were 35.2 percent; and transfer payments were 18.2 percent. From 1998 to 1999, earnings increased 15.5 percent; dividends, interest, and rent increased 0.1 percent; and transfer payments increased 3.8 percent.

Earnings by persons employed in Roger Mills County increased from \$28,635,000 in 1998 to \$32,520,000 in 1999, an increase of 13.6 percent. The largest industries in 1999 were state and local government, 30.1 percent of earnings; farm, 18.0 percent; and services, 11.7 percent. Of the industries that accounted for at least 5 percent of earnings in 1999, the slowest growing from 1998 to 1999 was mining (5.4 percent of earnings in 1999), which decreased 32.9 percent; the fastest was farm, which increased 77.3 percent. The unemployment rates in Roger Mills County have been below 5% since 1992, and dipped below 2% for the first half of 2001.

DESCRIPTION OF EXISTING DAMS

Status and Action Covered

FWRS No.12 and No.17A were constructed in 1951 and 1952 respectively as low-hazard class “A” dams. Both FWRS are at, or have exceeded their 50-year designed life. FWRS No.12 has a 40° elbow in the principal spillway conduit that becomes clogged with debris and restricts flow, thereby impeding the proper operation of the dam. Site 12 also exhibits seepage through the embankment and has gullies on the upstream side of the dam near both abutments. Site 17A has a wide crack in the principal spillway conduit pipe about 95 feet from the outlet end that extends the entire circumference of the pipe. Also, a mobile home is located immediately below site 17A and as a result, the potential for loss of life exists if the dam suddenly fails. The planned action covered by this Rehabilitation Plan is to replace the degrading principal spillway conduits and inlet towers, redesign the auxiliary spillways to meet current dam safety criteria, and design the FWRS for 100 years of sediment storage. The sediment pool areas of both sites will be fenced and a freeze-proof livestock-watering tank or restricted livestock access ramp will be installed for erosion control and water quality improvement. Site 17A will be maintained as a low-hazard class “A” dam by relocating the mobile home out of the floodplain. Floodplain zoning ordinances will prohibit future development in the floodplain.

Hazard Classification

Sandstone Creek floodwater retarding structures (FWRS) 12 and 17A were originally built as Class “a” or low hazard structures. This hazard classification is for FWRS located in rural or agricultural areas where failure would only cause damage to farm buildings, agricultural lands, and county roads. Any potential chance of loss of life, or any damage to homes, commercial buildings, important public utilities, main highways, or railroads during a potential breach of the structure would require a change in the hazard classification and therefore the criteria to which the FWRS is constructed.

A mobile home is located approximately 100 feet below the centerline of FWRS 17A. This single structure would require a classification change of FWRS 17A to class “C” or high hazard

since any inhabitants of this mobile home would face potential loss of life during a breach event. In order to prevent this classification change and the associated increase in criteria and related costs, this mobile home is to be removed from the potential breach impact area. The breach analysis of FWRS 17A did not reveal any other potential impact area other than the mobile home. A breach analysis of FWRS 12 did not reveal any potential impact area that would require a hazard classification change from class “A”.

Sandstone Creek FWRS 12 and 17A are to be rehabilitated as class “A” or low hazard structures. It is important to prevent any future development within the potential breach impact area of these structures that would result in a change in the hazard classification. Therefore, it is necessary for the local Floodplain Board to zone the potential breach impact area to prevent future development. The breach inundation maps show the location and extent of the potential breach inundation area (gray) for each structure. The potential breach inundation areas are carried downstream far enough to be within channel or the existing 100-year floodplain. For zoning purposes, the greater of the breach inundation area or the 100-year floodplain should be used. The maps also show the area inundated within the structure by the breach storm (blue), which is the same as the top of dam elevation and was used to develop the breach peak. The maps also show the cross sections (purple) used in the breach analysis and the base flood elevation lines (blue) with corresponding elevations.

Breach Analysis of Site 12

Sandstone Creek Site 12 is located in S25-T12N-R23W in Roger Mills County and has a drainage area of 862 acres. The site is located on an unnamed tributary that flows 2000 feet downstream to its confluence with the main stem of Sandstone Creek. The potential breach area is agricultural and has no identified potential damage locations. Breach analysis was performed utilizing 10 cross-sections to represent the floodplain. Cross-sections 1 and 2 were developed from the original centerline cross-section from the AS-BUILT plans. Cross-sections 3, 4, 6, 7, and 9 were taken from USGS quad maps. Cross-sectional ratings for cross-sections 1, 2, 3, 4, 6, 7, and 9 were developed with use of a computer program that develops normal ratings. Cross-sectional ratings for cross-sections 5, 8, and 10 were developed earlier during the Roger Mills Flood Insurance Study (FIS). The maximum breach discharge and storage volume were developed and routed downstream with the use of the “Simplified Dam-Breach Routing Procedure” or TR-66 computer program. The results of the breach analysis are shown in Table A and Appendix B: Breach Inundation Map. A hazard classification of class “A” is recommended for this structure.

Table A - Results of Dam Breach Routing for Site 12

Cross Section Number	Distance From Dam In Feet	Peak Discharge At The X-Section (CFS)	Maximum Elevation Of Water Surface At X-Section (feet)
1	0	44750	1964.3
2	400	39600	1941.3
3	1300	32700	1923.1
4	2550	23500	1911.4
5	4200	18200	1907.1
6	6500	13300	1903.3
7	8900	9190	1891.6
8	11250	6830	1879.0
9	14250	5440	1866.7

10	18050	4150	1850.2
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Breach Analysis of Site 17A

Sandstone Creek Site 17A is located in S14-T12N-R23W in Roger Mills County and has a drainage area of 532 acres. The site is located on an unnamed tributary that flows 2000 feet downstream to its confluence with Currant Creek. The potential breach area is agricultural and has two identified potential damage locations; a mobile home located directly below the structure that is to be moved and a concrete block house located 3950 feet below the structure. Breach analysis was performed utilizing 9 cross-sections to represent the floodplain. Cross-section 1 was developed from the original centerline cross-section from the AS-BUILT plans. Cross-sections 2, 4, 5, and 6 were surveyed in March of 2001. Cross-sectional ratings for cross-sections 1, 2, 4, 5, and 6 were developed with use of a computer program that develops normal ratings. Cross-sectional ratings for cross-sections 3, 7, 8, and 9 were developed earlier during the Roger Mills FIS. The maximum breach discharge and storage volume were developed and routed downstream with the use of the "Simplified Dam-Breach Routing Procedure" or TR-66 computer program. The results of the breach analysis are shown in Table B and Appendix B: Breach Inundation Map. The results at potential downstream damage locations show that at 100 feet downstream of the dam the mobile home is flooded at a depth of 3.2 feet. The concrete blockhouse is not affected by the breach. A hazard classification of class "A" is recommended for this structure if the mobile home is removed as planned from the breach impact area.

Table B - Results of Dam Breach Routing for Site 17A

Cross Section Number	Distance From Dam In Feet	Peak Discharge At The X-Section (CFS)	Maximum Elevation Of Water Surface At Section (feet)
1	0	37100	2011.6
2	100	35700	1988.2
3	2400	20500	1965.4
4	3950	16000	1954.0
5	5750	11200	1948.8
6	7250	8650	1923.4
7	9400	7530	1915.2
8	12200	6460	1899.2
9	19200	3830	1877.5

Evaluation of Potential Failure Modes

Sedimentation: Sediment is deposited in both the sediment pool and the flood detention pool. When the sediment pool has filled to the elevation of the principal spillway inlet, the pool no longer has permanent water storage, but still has some level of flood control. As the detention pool loses storage due to sediment deposition, the auxiliary spillway operates, or has flowage, more often and is therefore subject to erosion. A potential mode of failure exists as the auxiliary spillway continues to degrade and depth of flow increases. The dam will ultimately breach.

Sites 12 and 17A were designed with a 50-year sediment storage life. There is no record of either auxiliary spillway ever carrying flood flows. Reservoir sediment surveys were conducted

on both sites in 1995 and 2001. Site 12 is depositing sediment in the sediment pool at a rate of about 1.23 acre-feet per year. The 2001 sediment survey indicated that site 12 had about 100 years of sediment storage still available. The reason so much sediment storage was built into site 12 is because of the location and design of the auxiliary spillway, which is laid out around a hill of erosion resistant sandstone. It was less expensive to build a higher dam than it was to excavate sandstone in the auxiliary spillway. As a result, three times the needed sediment storage was built into site 12. Therefore, sedimentation is not a potential mode of failure for site 12 for at least 100 years. The 2001 sediment survey indicated that site 17A is depositing sediment at a rate of about 1.3 acre-feet per year and has about 16 years of sediment storage life still remaining. Therefore, sedimentation presents a low potential mode of failure for site 17A in the near future, but progressively higher as the dam ages and the site fills with sediment.

Hydrologic capacity: Hydrologic failure of a dam can occur by breaching the auxiliary spillway or overtopping the dam during a storm event. The integrity and stability of the auxiliary spillway is dependent on the depth, velocity, and duration of flow, the vegetal cover, and the spillway's resistance to erosion. The integrity of an embankment during overtopping is dependent on the depth, velocity, and duration of flow, the vegetal cover, and the embankment's resistance to erosion.

Site 12 as originally designed will handle the runoff from 8.2 inches of rain falling in six hours without overtopping the embankment, as compared to the 100 year six hour rainfall of 5.6 inches. The principal spillway is 12 inches in diameter and has a non-standard inlet that is susceptible to being plugged by debris and sediment. The auxiliary spillway is 100 feet wide and has a maximum freeboard of four feet. The earthen auxiliary spillway is considered to have a low resistance to erosion and the vegetal cover is considered to be very poor. The dam embankment is earthen with a PI greater than 10, and also has a very poor vegetal cover. The overall potential for hydrologic failure of Sandstone Creek Site 12 is considered to be moderate to high.

Site 17a as originally designed will handle the runoff from 8.2 inches of rain falling in six hours without overtopping the embankment, as compared to the 100 year six hour rainfall of 5.6 inches. The principal spillway is 12 inches in diameter and has a non-standard inlet that is susceptible to being plugged by debris and sediment. The auxiliary spillway is 60 feet wide and has a maximum freeboard of four feet. The earthen auxiliary spillway is considered to have a low resistance to erosion and the vegetal cover is considered to be very poor. The dam embankment is earthen with a PI greater than 10, and also has a very poor vegetal cover. The overall potential for hydrologic failure of Sandstone Creek Site 17a is considered to be moderate to high.

Seepage: Embankment and Foundation seepage can contribute to failure of an embankment by removing (piping) soil material through the embankment or foundation. As the soil material is removed, the voids created allow even more water flow through the embankment or foundation, until the dam collapses due to the internal erosion. Seepage that increases with increases in pool elevation is an indication of a potential problem, as is stained or muddy water or "sand boils". Foundation and embankment drainage systems can alleviate the seepage problem by removing the water without allowing soil particles to be transported away from the dam.

Site 17A does not exhibit obvious signs of excessive seepage, however there is an area of heavy vegetation along the downstream toe, which is indicative of higher soil moisture levels. Site 12 has a definite area of seepage along the downstream toe just to the right of the historic stream channel near the area of maximum fill. This seepage is reasonably clear water, however there are signs of minor sand boils, and the seepage increases noticeably with an increase in pool elevation. Seepage provides a low to moderate potential for failure for site 12.

Seismic: The integrity and stability of an earthen embankment are dependent upon the presence of a stable foundation. Foundation movement through consolidation, compression, or lateral movement can cause the creation of voids within an embankment, separation of the principal spillway conduit joints, or in extreme cases, complete collapse of the embankment. The Sandstone Creek watershed is not located within an area of significant seismic risk; therefore seismic activity does not create a potential for failure for sites 12 or 17A.

Material Deterioration: The materials used in the principal spillway system, the foundation and embankment drains, and the pool drainage systems are subject to weathering and chemical reaction due to natural elements within the soil, water, and atmosphere. Concrete risers and conduits can deteriorate and crack, metal components will rust and corrode, and leaks can develop. Embankment failure can occur from internal erosion caused by these leaks.

Site 17A has a concrete principal spillway inlet and conduit, which are showing signs of weathering and deterioration. Deterioration of the conduit and bedding is creating the potential for leakage at the pipe joints. A robotic camera discovered a crack in the principal spillway pipe about 95 feet from the outlet end that extends the entire circumference of the pipe. This crack creates an avenue for water to move through the pipe carrying embankment soil material with it and increasing the potential for a dam failure. Material deterioration is creating a moderate potential for failure in the near future, but will increase with time.

Site 12 has a concrete conduit through the embankment, then a metal conduit from an elbow on the downstream toe to the outlet channel. The outlet end of the metal conduit is showing rust and corrosion, the conduit is beginning to deteriorate, and the elbow is subject to clogging from debris due to the sharp angle and the small diameter of the pipe. Material deterioration is creating a low to moderate potential for failure in the near future.

Status of Operation and Maintenance

Recent O&M reports indicate that operation and maintenance has been kept current on these sites. This has been verified through site assessments. However, due to the age of these structures, and the design criteria used, O&M will become increasingly more complex and expensive. Local resources will not be able to meet all the needs for these two sites and all other sites within the Upper Washita Conservation District.

PROBLEMS AND OPPORTUNITIES

Sites 12 and 17A have reached the end of their 50-year designed life and have deteriorating structural components that threaten the integrity and safety of the dams. These dams do not meet current design and safety criteria. Site 17A poses a threat to loss of human life because of a mobile home located immediately downstream of the dam. Loss of flood control would result in pre-project levels of flooding and associated damages, and disruption of already very limited transportation routes. Livestock watering in the pool areas of both sites have created erosion and sedimentation problems, as well as, water quality concerns.

Deteriorating Structural Components

Site 17A has a concrete principal spillway inlet and conduit that are showing signs of weathering and deterioration. Deterioration of the conduit and bedding is creating potential for leakage at the pipe joints. The principal spillway conduit diameter is 12 inches, which is less than current design criteria. Site 12 has a concrete conduit through the embankment, then a metal conduit from an elbow on the downstream toe to the outlet channel. The outlet end of the metal conduit is showing rust and corrosion, the conduit is beginning to deteriorate, and the elbow is subject to clogging from debris due to the sharp angle and the small diameter of the pipe. The principal spillway conduit is 12 inches in diameter, which is less than current design criteria, and the elbow in the principal spillway conduit does not meet current design practices due to the possibility of clogging. Site 12 exhibits year-round seepage through the embankment and has critically eroding gullies on the upstream side of the dam.

Loss of Flood Control

Continual deterioration of the sites, which would ultimately result in failure of the dams, or the decommissioning of the dams, would both result in a loss of flood control. This would return the sub-watersheds to pre-project levels of flooding, or greater, with average annual flood damages of \$37,500 if the dams are decommissioned, to \$43,300 if the dams are allowed to fail. The potential for loss of human life exists because of a mobile home that is located immediately downstream of site 17A. This does not meet the objectives of the project sponsors. Few transportation routes exist in this watershed. All roads are gravel and most are maintained by oil and gas companies, not the county. Loss of flood control would adversely impact transportation routes, affecting school bus routes, emergency vehicle access, agricultural activities, access to towns and shopping, oil and gas production activities, and normal quality of life.

Erosion and Sedimentation

Gullies are present on the upstream side of site 12 near the left abutment and along the forebay of the auxiliary spillway near the right abutment. The largest gully, in the forebay area, is approximately 8 feet wide, 16 feet deep, 200 feet long, and extends into the sediment pool. This has resulted in nearly 1,000 cubic yards of eroded soil being deposited into the sediment pool. This gully is advancing up the fence line to the crest section of the auxiliary spillway. Other smaller gullies exist along the slopes leading down to the sediment pool and are caused by cattle traversing the slopes to get to water. Although the rate of gully advancement has not been

determined due to a lack of historic data, if this erosion continues unchecked, the sedimentation will accelerate and adversely impact the planned sediment storage of the site and shorten the designed life. In addition, gully advancement could impact the crest section of the auxiliary spillway.

Water Quality

Excessive sedimentation and cattle watering in pool areas has increased turbidity and nutrient levels in the water of both sites. Cattle grazing activity in the pool areas also impact fish and wildlife habitat and wetlands. Although pool levels do fluctuate because of low rainfall and high evaporation rates in this area, the turbid and nutrient rich waters negatively impact fish and other aquatic animal life. Cattle activity, including grazing, standing, and soil compaction, inhibit the establishment of riparian vegetation and emergent wetlands. Currently, Sandstone Creek is not on the State's 303(d) list of impaired water bodies, but the downstream Washita River and Foss Lake are on the 303(d). Loss of flood control from these sites would result in over 4,000 tons of sediment per year being passed on downstream to the Washita River and Foss Lake, further impairing the water quality and beneficial uses of those water bodies, which include public and private water supply and recreation.

Opportunities

Alternative livestock watering facilities or practices can be installed which will address many of the problems associated with present cattle activities in the pool areas of both sites. The landowner of site 12 and site 17A is agreeable to fencing both pool areas two feet above the principal spillway elevation to restrict livestock access to the pools. A grazing management plan will be developed to allow flash grazing within these fenced areas. A freeze-proof watering tank will be installed downstream of site 17A and a restricted, gravel access ramp will be installed on site 12. These alternative-watering facilities will meet the management plan of the landowner and will also reduce erosion and sedimentation, enhance fish and wildlife habitat and the development of emergent wetlands by restricting livestock access and improving water quality.

SCOPE OF THE ENVIRONMENTAL ASSESSMENT

A scoping process was conducted to determine objectives and primary concerns of the project sponsors and to identify other relevant issues and environmental effects associated with this rehabilitation project. Several meetings and watershed site visits were held with the U.S. Fish and Wildlife Service, Oklahoma Department of Wildlife Conservation, Wildlife Management Institute, and the U.S. Army Corps of Engineers to discuss issues on, and potential impacts to, wetlands, riparian habitat, and fish and wildlife habitat. Areas of potential concern were evaluated and are listed in Table C along with their significance to decision making.

Table C
Evaluation of Identified Concerns

Environmental, Economic, Social & Cultural Concerns	Degree of Concern	Significance ² to Decision Making ³	Remarks
Human Health & Safety	High	High	Primary concern of sponsors
Floodwater Damage	High	High	Primary concern of sponsors
Erosion & Sedimentation	High	High	Primary concern of sponsors
Economic & Social	High	High	Primary concern of sponsors
Archaeological & Historical Resources	High	High	Primary concern of SHPO
Threatened & Endangered Species	High	High	Primary concern of USFWL
Streams, Lakes, & Wetlands	High	High	Primary concern of USFWL, ODWC, WL Mgt. Institute
Fish & Wildlife Resources	High	High	Primary concern of USFWL, ODWC, WL Mgt. Institute
Water Quality	High	High	Primary concern downstream to Washita River& Foss Lake
Transportation	Medium	Medium	
Land Use & Management	Medium	Medium	
Prime Farmlands	Medium	Medium	

FORMULATION OF ALTERNATIVES

The problems and opportunities that exist in the watershed drove the formulation process. The primary objective of the project sponsors is the continuation of flood protection and the prevention of loss of human life. Structural and non-structural alternatives were formulated to address structural integrity concerns and safety and performance standards of the flood control

² CEQ regulations for evaluating intensity of significance (40 CFR 1508.27)

³ High – Must be considered in the analysis of alternatives

Medium – May be affected by some alternative solutions

Low – Considered, but not significant

dams. Upgrading site 17A to a high hazard class “C” dam because of downstream development was considered, but not developed into an alternative plan because of the high cost of class “C” construction versus the relocation of a mobile home and maintaining site 17A as a low hazard class “A” dam.

The U.S. Fish and Wildlife Service (USFWS), Oklahoma Department of Wildlife Conservation (ODWC), and the Wildlife Management Institute have determined that fish and wildlife habitat and wetlands would be enhanced by fencing the permanent pools of both sites to restrict livestock access to water. The landowner of both sites is interested in habitat improvement in conjunction with his livestock management plans, which will include a freeze-proof stock tank.

DESCRIPTION OF ALTERNATIVE PLANS

No Action

The no action alternative describes a plan to do nothing in terms of a federal action. No federal funds would be expended and no benefits would accrue beyond the designed life of the structures because there would be no federal project. The original project sponsors may or may not continue to operate and maintain the structures, so there may or may not be some level of flood control for some period of time beyond the designed life of the structures. This flood control, if it exists, should be regarded as existing (present) conditions, not benefits. Anything that is associated with the FWRS, or is incidental because of the existence of the FWRS such as fish and wildlife habitat or wetlands, should be regarded as existing (present) resource conditions, not benefits.

The uncertainty of the sponsor’s actions is due to the absence of federal financial assistance. Federal financial assistance in the form of remedial repairs is not authorized once a dam has reached the end of its designed life. Oklahoma has more requests for remedial repairs of dams each year than current levels of funding can address. Without federal financial assistance these dams will deteriorate more rapidly than they do now with ongoing repairs. Because of the uncertainty of the sponsor’s future actions, and for safety and environmental reasons, the no action alternative will be evaluated on the assumption that the dams will stop providing flood damage reduction. The average annual flood damages for the no action alternative will be the same as pre-project damages. Dam breach flood damages are calculated as a one-time event, but not included in any average annual calculation. It is believed that the dams will fail sometime in the 100-year evaluation period, but when is unknown. Thus, the economic evaluation is based on a range of possible dates for which loss of flood control functions from either site could occur.

Decommissioning

This alternative describes a plan to remove the flood detention capability of both dams by cutting out a section of each embankment down to the valley floor. A concrete or rock drop structure would be installed to stabilize the stored sediment behind each dam. Drop structures needed for stabilization of accumulated sediment for each site are estimated to have bottom widths of 40

feet, depths of 3.6 feet, and approximately 12 feet of drop from inlet channel to outlet channel. The mobile home located below site 17A would be relocated out of the floodplain. The project sponsors would then have operation and maintenance responsibilities for the drop structures.

Rehabilitation (the NED alternative)

Rehabilitation consists of structural and non-structural measures designed to extend the life of both FWRS for 100 years and meet applicable safety and performance standards. The deteriorating principal spillway conduits, constructed of corrugated metal pipe, and inlet towers will be removed and replaced. The mobile home below site 17A will be relocated out of the breach inundation area to avoid upgrading the site to high hazard class “C” criteria. The difference in cost between class “A” and class “C” in this case is about \$275,000. Both FWRS will be maintained as low hazard class “A” structures. Front slope protection, foundation drainage, and other items will be included as needed on each site. Critically eroding areas will be filled and shaped and diversions installed as needed to prevent future erosion and associated impacts on reservoir sediment storage. The 100-year sediment pool areas will be fenced to restrict livestock access, thereby reducing sediment and nutrients, improving water quality, and enhancing fish and wildlife and wetland habitat. Floodplain zoning will be implemented to prevent future development within the affected floodplains and breach inundation areas.

EFFECTS OF ALTERNATIVE PLANS

Human Health and Safety

Existing Conditions: Site 17A was designed and built as a low hazard class “A” dam. It was not designed to provide the level of safety necessary to protect downstream homes. A mobile home is presently located immediately downstream of the dam, which creates the potential for loss of human life.

No Action (Future Without Project): Without federal financial and technical assistance and sponsor operation and maintenance, both FWRS would continue to fill with sediment, provide increasingly less flood control, degrade structurally, and ultimately fail. The potential for a catastrophic breach would exist and increase the chance for loss of human life.

Decommissioning: The relocation of the mobile home below site 17A would eliminate the potential for loss of human life. However, once the flood detention capability of both dams is removed, the floodplains below both dams would return to pre-project levels of flooding with associated damages to floodplains, roads, and bridges and risks to those people that live and work in the area.

Rehabilitation: Both FWRS will be structurally rehabilitated using current design and safety criteria in order to provide continued flood protection for an additional 100 years. The mobile home below site 17A will be relocated out of the breach inundation area and the breach inundation areas of both sites would be zoned to prohibit future development.

Floodwater Damage

Existing Conditions: The Sandstone Creek Watershed has not experienced major flooding for the 50 years that the project has been in place. Currently sites 12 and 17A are providing \$46,900 in average-annual flood-damage reduction, \$28,800 for site 12 and \$18,100 for site 17A. With both sites in place, \$3,500 of average annual flood damages still occurs, \$2,200 for site 12 and \$1,300 for site 17A.

No Action (Future Without Project): A catastrophic breach of site 12 would cost \$143,800 in terms of damages from the breach flood waters and sediment deposition, installation of structures to stabilize headcuts and stored sediment in the sediment pools, and loss/replacement of livestock water. A catastrophic breach of site 17A would cost \$162,000 in terms of flood related damages, stabilization structures, loss/replacement of livestock water, destruction of the mobile home below the dam, and redesign and construction of the culvert and county road currently protected by the dam. However, with the increasing probability of a dam breach over time, and the resulting filling of the stream channels with sediment, the probable annual flood damages would increase to more than the original pre-project damages.

Decommissioning: The removal of the flood detention capability, or controlled breach, of the two FWRS would result in a return to pre-project flooding conditions. The consequences associated with a catastrophic breach would be avoided. The mobile home below site 17A would be relocated out of the 100-year floodplain. Drop structures would be installed to stabilize the breach, or notch cut in the dams. This would prevent erosion of the remaining embankments and stored sediment, which would be deposited in streams reducing hydraulic capacity and increasing flooding and associated damages. The average annual flood damages would increase to \$23,400 for site 12 and \$14,100 for site 17A.

Rehabilitation: The flood reduction benefits currently provided by FWRS No.12 and No.17A will be extended for 100 years into the future. FWRS No.12 is designed to provide flood detention storage for the 25-Year Frequency Storm with a maximum release rate of 35 cubic feet per second (cfs). FWRS No.17A is designed to provide flood detention storage for the 25-Year Frequency Storm with a maximum release rate of 34 cfs. There will not be an appreciable change in the level of flood control provided by the rehabilitated structures.

The peak storm flows on the streams below FWRS No.12 and No.17A would continue to be greatly reduced resulting in reduced flooding and damages. The duration of the flows would be prolonged due to the designed release of floodwater from these structures. There would not be an appreciable decrease in the average annual runoff from FWRS 12 and 17A. The annual yield from Site 12 would not change since the existing sediment pool would not be changed. The sediment pool for Site 17A would increase in size from 9 acres to 16 acres of surface area, creating a potential for approximately 44 percent more evaporation loss from the structure. However, due to the high evaporation rates, these structures have not and would not maintain water surface elevations near the principal spillway elevation. In addition, site 17A would be built with two additional ports to limit permanent water depth and surface area. These ports would also serve to limit loss from evaporation by maintaining a smaller water surface area for a longer period of time.

The rehabilitation of sites 12 and 17A would result in the continuation of present flood-damage reduction, but at a higher level of safety. The mobile home below site 17A would be relocated out of the breach inundation area and zoning ordinances would prohibit development in the floodplains. This would eliminate the potential for damages to homes caused by flooding.

Erosion and Sedimentation

Existing Conditions: Sites 12 and 17A have trapped over 200,000 tons of sediment over the last 50 years. Currently, site 12 traps about 1.7 acre-feet of sediment per year, or nearly 3,000 tons. Site 17A traps about 1.9 acre-feet of sediment per year, or about 3,155 tons. Gullies caused by livestock exist on the upstream side of site 12 near the left abutment and at the forebay of the auxiliary spillway.

No Action (Future Without Project): The environmental impacts of an uncontrolled catastrophic breach would be negative in terms of the immediate release of about 4,060 tons of sediment from site 12 and 2,800 tons of sediment from site 17A into the stream channels. Headcuts would then develop at the point of dam failure, and erode upstream through the sediment pools and beyond, depositing more sediment into the stream system. The remaining embankments would also erode. The potential total sediment load deposited in the streams would be environmentally severe; 153,675 tons of sediment from site 12 and 135,500 tons of sediment from site 17A. The stream channels would aggrade resulting in a loss of channel capacity and increased flooding, and there would be an increase in sediment deposition on previously protected floodplains. In fact, flooding would exceed levels that existed prior to the completion of this flood control project because of reduced channel capacity.

Decommissioning: Taking the dams out of flood control service would return the floodplains to pre-project levels of flooding with associated sediment and scour damages. However, the potential catastrophic breach event and subsequent erosion of embankments and stored sediment, nearly 300,000 tons, would be avoided. Drop structures would be installed to stabilize the controlled breach section of each dam and stored sediment in the sediment pools. About 6,160 tons of sediment per year that is currently trapped by the FWRS would pass on through the stream system eventually making its way to the Washita River and Foss Lake, both of which are currently listed on the State's 303(d) list of impaired waters.

Rehabilitation: The dams will continue to provide flood control and virtually eliminate sediment and scour erosion for the next 100 years. The dams will also trap about 616,000 tons of sediment over their designed lifetime, which is sediment that will not be deposited in the Washita River and Foss Lake. Gullies on the upstream side of site 12 will be shaped and/or filled, eliminating a sediment source that would effect the designed storage of the site. The sediment pools of both sites will be fenced two feet above the elevation of the principal spillway to restrict livestock access and reduce erosion.

Economic and Social

Existing Conditions: Sites 12 and 17A are providing flood protection as they have for the last 50 years. A generation of people has grown up and raised families of their own under the protection that these sites have provided. Residents make a living from the land and travel through the watershed on a daily basis; a lifestyle afforded them because of the existing flood control dams. Site 12 provides \$28,800 of average-annual benefits from reduced flooding. Site 17A provides \$18,100 of average-annual benefits from reduced flooding.

No Action (Future Without Project): There are no federal monetary costs with taking no action because there is no federal project. Hence, there are no federal benefits even though the dams may provide some level of flood control for a period of time beyond the end of their designed life. However, there are other monetary costs associated with the no action alternative.

If the dams deteriorate to a point where catastrophic failures occur, damages could cost \$143,800 for site 12 and \$162,000 for site 17A. Flooding would resume, but at levels greater than pre-project flooding because of lost hydraulic capacity of the stream channels due to aggradation from catastrophic sediment deposition. The average annual flood damages would be \$27,100 for site 12 and \$16,200 for site 17A. There is also the potential for loss of human life below site 17A and damages from loss of a mobile home, personal property, and utilities.

Additionally, there is the question of liability due to negligence. In a recent court decision⁴, the Pennsylvania Superior Court held a dam owner liable for damages sustained by downstream property owners when a series of three dams overtopped. The Court ruled that the dam owner did not exercise the degree of care commensurate with the risk of storing water in a reservoir by operating and maintaining the dam in a safe condition. In Oklahoma, the Oklahoma Water Resources Board provides rules and guidelines for operation and maintenance and dam safety, which are set forth in Title 785:25 of the Oklahoma Administrative Code (82 O.S., Sections 105.25-105.27 and 1085.2).

Decommissioning: There are no overriding environmental or geologic reasons to remove these dams, such as an endangered species or a latent geologic condition that would make structural rehabilitation unfeasible, and the project sponsors do not want to lose the flood control that these dams have provided for the last 50 years. Therefore, to decommission sites 12 and 17A would result in negative economic and social impacts.

There is significant cost associated with decommissioning; about \$221,600 for site 12 and \$173,850 for site 17A, a total of \$395,450. Federal dollars would be spent which ultimately would result in increased flooding and flood-related damages. The average annual flood damages would be \$23,400 for site 12 and \$14,100 for site 17A. This would result in negative net benefits because dollars would be spent to create damages. Although the Operation and Maintenance (O&M) responsibilities of the sponsors would be eliminated for the FWRS, new O&M responsibilities would be required for the drop structures needed to stabilize the breach, or notch cut in the dams. The net O&M costs would be similar.

⁴ "Court Holds Dam Owner Negligent", Watershed News, April-May-June 2001.

There would be other negative economic and social effects on the residents of the watershed who depend on flood control in order to conduct their farming and ranching business. Grazing management systems would be interrupted or stopped, hay production lost, winter wheat damaged or lost, fences damaged, livestock lost or killed, loss of livestock water, and farming equipment damaged. Roads would be damaged or closed resulting in a disruption to local transportation routes, which would affect all aspects of social life including access to towns, shopping, medical care, and schools.

Rehabilitation: Structural rehabilitation of sites 12 and 17A will provide continued flood protection to the residents of the watershed for an additional 100 years. This will have a positive economic and social impact on residents whose lifestyle has relied on flood control for the last 50 years. This alternative provides greater safety and design criteria for the rehabilitated FWRS and includes relocation of a mobile home below site 17A to a safer location and floodplain zoning to prohibit future development in the floodplains.

The total cost associated with structural rehabilitation and relocation is \$380,100 if both sites are rehabilitated under one contract. If contracting and mobilization of the sites are done independently, the costs would increase to \$406,900; \$169,200 for site 12 and \$237,700 for site 17A.

The rehabilitation of FWRS No. 12 and No. 17A will result in new monies being injected into the local economy from the \$372,200 of construction expenditures. This will create 14 person years of employment and \$1,030,890 in sales as the funds circulate through the local economy. This action will prevent probable dam failures and possible breach flood losses of \$143,800 for site 12 and \$162,000 for site 17A for over another 100 years. This action will maintain average annual benefits from reduced flooding of \$28,800 for site 12 and \$18,100 for site 17A.

Archaeological and Historical Resources

Existing Conditions: FWRS No. 12 and No. 17A were constructed prior to the National Historic Preservation Act of 1966 (NHPA) and as a result no cultural resource surveys were conducted at those locations in 1950. A NRCS archaeologist surveyed the planned project area in April 2001. The report, entitled *NRCS, Cultural Resources Survey Report, Cheyenne Field Office, Roger Mills County, Small Watershed Rehabilitation Amendments of 2000 (PL 106-472): Sandstone Creek Watershed-Rehabilitation of Site #12*, is a nine-page summary of the pedestrian survey and subsurface testing which includes comments on previous archaeological work in the immediate vicinity. One tertiary flake measuring 44 x 43 x 8 mm and weighing 14.4 grams was discovered. The artifact is considered to be an “isolated find”. One National Register site, 34RM14, is listed in the area. A similar report was produced for site 17A. The report, *NRCS, Cultural Resources Survey Report, Cheyenne Field Office, Roger Mills County, Small Watershed Rehabilitation Amendments of 2000 (PL 106-472): Sandstone Creek Watershed Rehabilitation of Site #17A*, was concurred in by the State Archaeologist and State Historic Preservation Officer, as was the report for site 12. No artifacts were identified in the project area and no recorded archaeological sites are in the immediate project area.

The following American Indian governments were contacted regarding the current project: Wichita and Affiliated Tribes, Comanche Tribe, Kiowa Tribe, and Cheyenne-Arapaho Tribe. In addition, the State Historic Preservation Office and the Oklahoma Archaeological Survey were contacted about the general plan for rehabilitation in 1998 and contacted again in 2001 regarding the specific projects—Sites 12 and 17A. In June 2001 both the State Historic Preservation Office and Oklahoma Archaeological Survey concurred with the recommendations in the NRCS archaeologist's report. The four American Indian tribes who have ancestral or historic claim to the region registered no comment with NRCS or the planned projects.

Regarding the structures, the sites are over 50 years of age, which qualifies them to be an archaeological site within themselves. National Register of Historic Places eligibility uses a 50-year date as criteria for consideration. In general, historical archaeology has made an important impact on the way Americans view their collective history. Historic archaeology studies a broad body of evidence including traditional written records. Given that, the Oklahoma State Historic Preservation Officer, J. Blake Wade, concluded in 1998 that “documentation of these structures (50 year old dams) exist and is available to the public.” Mr. Wade continues “It is our opinion that the properties to be impacted are not eligible for listing on the National Register of Historic Places”. Although Sandstone Creek Watershed project is the world's first completed upstream flood control project, the individual dams that comprise the project are not considered unique.

No Action (Future Without Project): There is a high probability that intact cultural resources exist along the stream channels downstream of sites 12 and 17A. A catastrophic breach of the sites and the subsequent flooding and associated scour erosion could negatively affect previously unidentified cultural resources.

Decommissioning: This alternative would result in a return to pre-project levels of flooding and associated sediment and scour damages that could negatively affect previously unidentified cultural resources, but to a lesser degree than the no action alternative.

Rehabilitation: Based on the current level of investigation, no cultural resources, historic or prehistoric, will be impacted by the rehabilitation projects. This determination is supported by the two state agencies that monitor cultural resources in Oklahoma.

A construction inspector with NRCS, who has completed the National Cultural Resources Training Program, will be on location to monitor construction activities and to ensure that any cultural resources discovered will be protected until they can be evaluated by a professional archaeologist. If protection, preservation, recovery, or other mitigation of cultural resources becomes necessary at any time, NRCS will follow the procedures outlined in the NRCS General Manual (GM 420 Part 401) and 7 CFR 656 (NRCS Procedures for the Protection of Archaeological and Historic Properties Encountered in NRCS Programs). The Oklahoma State Conservationist has determined that NRCS will be responsible for all costs associated with cultural resource surveys and investigations within the project areas. NRCS will consult closely with the State Historic Preservation Office and the State Archaeologist during project implementation if cultural resources are discovered.

Threatened and Endangered Species

Existing Conditions: The following species are listed for Roger Mills County on the U.S. Fish and Wildlife Service document “Oklahoma Federally Listed or Endangered Species, Proposed Species, and Candidate Species, County Distributions, April 2001.”

The endangered interior least tern (*Sterna antillarum*) nest on islands or sandbars along most of the larger rivers in Oklahoma. They are also known to nest at several salt flat areas in northcentral and northwest Oklahoma. The endangered whooping crane (*Grus americana*) passes through western Oklahoma each spring and fall during migration. The threatened bald eagle (*Haliaeetus leucocephalus*) is known to overwinter in Oklahoma where it concentrates along major rivers and reservoirs throughout the state. The threatened Arkansas River shiner (*Notropis girardi*) is found in the main channels of large sandy-bottomed rivers and streams feeding the Arkansas River. Both the black-tailed prairie dog (*Cynomys ludovicianus*) and the lesser prairie chicken (*Tympanuchus pallidicinctus*) are listed as candidate species.

No Action (Future Without Project): The loss of the pool areas could negatively impact the endangered whooping crane and threatened bald eagle. The impacts of catastrophic sediment deposition in stream systems as a result of dam failures could negatively impact the nesting habitat of the interior least tern.

Decommissioning: The loss of the pool areas of sites 12 and 17A could negatively impact the endangered whooping crane and threatened bald eagle.

Rehabilitation: The rehabilitation of FWRS No. 12 and No. 17A is not expected to adversely affect any of the species named above. To the contrary, rehabilitation will provide an additional 100 years of pool and wetland habitat available to the endangered whooping crane and threatened bald eagle, as well as protect stream-nesting areas for the endangered interior least tern.

Streams, Lakes, and Wetlands

Existing Conditions: The only wetlands existing in the project area are the pool areas of the FWRS themselves and a few small ponds located within the drainage area of the FWRS. No significant areas of emergent wetland vegetation are present around the shoreline of either site 12 or site 17A. Streams are intermittent in nature. Both sites reduce sediment to stream systems.

No Action (Future Without Project): This alternative would result in the loss of the existing pool and wetland areas provided by sites 12 and 17A, about 19.3 acres. A catastrophic breach would result in a loss of hydraulic capacity of the stream systems, making them ephemeral in nature, but increasing pre-project levels of flooding. Flooding could have a positive affect on creating downstream wetland areas.

Decommissioning: This alternative results in a loss of 19.3 acres of pool and wetland areas. There would be a return to pre-project levels of flooding that could have a positive affect on creating downstream wetland areas.

Rehabilitation: No existing wetlands will be affected by rehabilitation of sites 12 and 17A other than the temporary, short-term drainage of the pools during construction activities and the slight increase in water depth of site 17A after completion. However, the fencing of the sediment pool areas will enhance the opportunity for emergent wetland vegetation to develop. Mitigation for loss of wetland habitat due to installation of the project will not be warranted due to very slight changes in sediment pool sizes and water depths.

Fish and Wildlife Resources

Existing Conditions: Terrestrial wildlife habitat in the area of FWRS No.12 and No.17A is primarily native grassland with small acreages of tame pasture, upland timber, and riparian timber interspersed. The native grassland is composed mainly of mid and short grasses such as little bluestem, sand bluestem, side-oats grama, blue grama, and buffalograss. The tame pasture is bermudagrass and the upland timber consists mainly of scattered woody shrubs such as sandsage, skunkbush, sandplum, and shinnery oak. The narrow, non-continuous riparian timber is mostly willow, elm, and hackberry.

Aquatic wildlife habitat is present at the pool areas of the two structures and at small ponds located in the drainage areas of the sites. These aquatic habitats are seasonal due to low annual precipitation and intermittent nature of the streams.

No Action (Future Without Project): This alternative would result in the loss of 19.3 acres of aquatic habitat that would negatively impact fish and wildlife. Some terrestrial habitat that exists in association with the pools would be lost, but other types of habitat would naturally regenerate in the areas previously occupied by water. The already limited aquatic stream habitat would be further impaired by a large increase in sediment deposition that would increase turbidity and reduce dissolved oxygen levels.

Decommissioning: This alternative would result in the loss of 19.3 acres of aquatic habitat that would have a negative impact on fish and wildlife habitat, both in the pools themselves, and in the streams. Some terrestrial habitat would be lost, but this would be offset by the natural regeneration of terrestrial habitat in the former pool areas.

Rehabilitation: Rehabilitation of the two FWRS will enhance both terrestrial and aquatic wildlife habitats by maintaining or increasing shallow-water wetland habitat. The planned fencing of the sediment pool areas will improve water quality by restricting livestock access and also enhance the opportunity for emergent wetland vegetation to develop. Terrestrial habitat will be affected only by minor disturbance of ground cover grasses on the embankment and auxiliary spillway areas of the FWRS. Aquatic habitat at the sites will be affected short-term by drainage of the pools during construction activities.

Water Quality

Existing Conditions: The Sandstone Creek Flood Control Project was completed prior to the Clean Water Act of 1986. Since November 1998, the Oklahoma Water Resources Board

(OWRB) has been monitoring water quality data from Sandstone Creek from a fixed ambient monitoring station (AT324200). According to the Oklahoma Water Quality Standards, the beneficial uses of Sandstone Creek are Public and Private Water Supply (PPWS), Warm Water Aquatic Community (WWAC), Agriculture (Ag), Municipal and Industrial Process and Cooling Water (M&I), Primary Body Contact (PBC), and Aesthetics (Aes). The OWRB 1999 final report on Oklahoma's Beneficial Use Monitoring Program (BUMP) indicated that Sandstone Creek is not nutrient-threatened and is considered adequate to support its designated uses. Sandstone Creek is not listed on the 1998 303(d) List or the 1987 319 Non-point Source Assessment Report. However, the Washita River and Foss Lake, both downstream of Sandstone Creek, have been listed on the 303(d) List with water quality problems due to sediment and nutrients.

No Action (Future Without Project): This alternative would eventually result in the failure of both FWRS, with potentially catastrophic results which would include the deposition of nearly 300,000 tons of sediment into the stream system of Sandstone Creek. Flooding would exceed pre-project levels and some of this sediment would move downstream into the Washita River and Foss Lake which are on the State's 303(d) list of impaired water bodies.

Decommissioning: Sites 12 and 17A currently trap about 3.6 acre-feet of sediment per year, or 6,160 tons. Over a 100-year period, this amounts to over 600,000 tons of sediment that would be deposited into the stream system if these sites were decommissioned. There would be increased flooding and negative water quality impacts downstream to the Washita River and Foss Lake.

Rehabilitation: The water quality of sites 12 and 17A may be temporarily impaired during construction due to an increase in turbidity, but should improve after rehabilitation due to the installation of fences around the 100-year sediment pool areas. This fencing will restrict livestock access to the sediment pools, thereby reducing erosion and sediment, and deposition of nutrients from cattle standing in water.

Transportation

Existing Conditions: There are few roads throughout the watershed, particularly in and around the subwatersheds of sites 12 and 17A. Most roads are gravel and few are maintained by the county; most are oil and gas lease roads. Approximately 2.5 miles of county roads are protected from flooding by these two sites. People who live and work in the watershed rely on the roads for access to towns, shopping, medical services, school bus routes, oil and gas wells, and farm and ranch operations.

No Action (Future Without Project): This alternative would result in flooding and associated damages to roads and bridges at levels greater than those that existed prior to project implementation. The already very limited transportation routes would be disrupted or closed, making access to towns, schools, medical services, and work locations difficult, if not impossible, for potentially long periods of time. When site 17A fails to provide flood protection, the road below the site will have to be raised and a larger culvert installed.

Decommissioning: The removal of the dams would result in pre-project levels of flooding that would have a negative impact on limited transportation routes.

Rehabilitation: The continuation of flood control for another 100 years will provide continued access to transportation routes in the watershed that currently exist. Disruption of access to towns, shopping, schools, work places, and medical services will be avoided.

Land Use and Management

Existing Conditions: The majority of the land in the watershed is used for pasture and range. What little cropland exists, is planted in wheat for winter grazing to support the livestock industry. Sites 12 and 17A are currently providing a level of flood protection that allows the best use of the land given the current commodity prices. With flood protection, the potential exists for intensification of land use in the floodplains if commodity prices increase. The land use in the drainage area above site 12 is 86% pasture and rangeland, 12% cropland, and 2% other uses. The land use in the drainage area above site 17A is 100% pasture and rangeland.

No Action (Future Without Project): This alternative would result in continual loss of sediment storage, decline in the level of flood protection, deterioration of structural components of the dams, more frequent flows through the auxiliary spillways, and eventual failure of both dams. The floodplains would be subject to flooding at higher levels than existed prior to project implementation. Grazing management systems would be interrupted by frequent flooding events. Hay production could be lost and the productivity of the land would decline as sterile sediment is deposited on the land by floodwaters. Livestock could become stranded or killed. The opportunity for intensification of land use in the floodplains would be lost with the loss of flood control.

Decommissioning: Taking the dams out of flood control service results in the same negative effects as the no action alternative, but at pre-project levels of flooding.

Rehabilitation: No appreciable change in land use will occur with the rehabilitation of FWRS No.12 and No.17A. About 4 acres at each site may be temporarily disturbed due to construction. Vegetation of the sites may result in the conversion of small acreages of native grassland to more erosion controlling grass species.

Prime Farmlands

Existing Conditions: Sixty two acres of prime farmland soils are prime farmland because of the flood protection provided by sites 12 and 17A.

No Action (Future Without Project): With the loss of flood control, 40 acres of prime farmland would be lost below site 12 and 22 acres below site 17A.

Decommissioning: With the loss of flood control, 40 acres of prime farmland would be lost below site 12 and 22 acres below site 17A.

Rehabilitation: Sixty two acres of prime farmland will be protected by rehabilitating sites 12 and 17A to provide flood control for another 100 years.

CUMULATIVE EFFECTS OF ALTERNATIVES

No Action

Taking no action to rehabilitate these aging flood control dams, which have deteriorating structural components, would ultimately result in failure of the dams. This would have negative social, economic, and environmental effects on the watershed and the people who live and work in the watershed, and there would be a risk of loss of human life. The danger of taking no action, besides the obvious consequences associated with dam failure and future flooding, would be the precedence it could potentially set for the other 2,093 flood control dams in Oklahoma that have yet to be rehabilitated. Two dams in the Sergeant Major Creek Watershed have already been rehabilitated. These dams not only provide flood control, but also municipal and industrial water supply, irrigation, recreation, fish and wildlife, and other benefits. A state and national infrastructure of highways and bridges has been constructed with the assumption that these dams would be maintained to provide cumulative flooding protection and sediment control. Approximately 774 highway bridges and 3,926 county bridges would be subject to damage as well as 429 miles of highways and 1,660 miles of county roads. Housing developments, schools, businesses, and agricultural lands are protected from flooding by a \$2 billion infrastructure of flood control dams across Oklahoma. If these dams were allowed to fail, over 1,184,500 acres of benefited floodplains would revert to pre-project and higher levels of flooding, and there would be significant risk of loss of human life caused by the breach floods and subsequent flooding events. These dams provide nearly \$150 million of average annual benefits, which would be lost if no action was taken to rehabilitate them.

Environmental impacts of taking no action on 2,095 flood control dams across Oklahoma would be significant if not devastating in some cases. Annually, these dams trap about 9.3 million tons of sediment per year. An estimated 325 million tons of sediment is currently stored by these structures. The dam embankments themselves constitute over 200 million tons of fill material. Failure of these dams would ultimately result in the release of over 525 million tons of sediment into stream systems, which would reduce the hydraulic capacity of streams and cause flooding at levels greater than those that existed prior to implementation of the flood control projects. Much of the sediment would move downstream and be deposited in major reservoirs, such as Lake Texoma, which would have a significant negative effect on the striped bass industry. The sediment would reduce water quality by increasing turbidity and decreasing dissolved oxygen levels. About 44,360 surface acres of impounded water that provide fish and wildlife habitat, wetland habitat, recreation, and irrigation would be lost. About 71,000 acres of prime farmland would be lost due to increased flooding. Archaeological and historical resources could be damaged or destroyed by catastrophic dam failures and increased levels of flooding.

Decommissioning

The cumulative effects of decommissioning 2,095 flood control dams would be similar to the no action alternative except that with the controlled breach of the dams, installation of drop structures would be included to stabilize the remaining embankments and stored sediment. The environmental impacts from sediment would not be as great, but the 9.3 million tons of sediment that is trapped each year by the structures would pass on down the stream systems, some of which would be deposited in major river reservoirs. Flooding would resume at pre-project levels. Decommissioning would require the relocation or flood proofing of hundreds of homes, businesses, and other structures to avoid flood damages. The cost of decommissioning is high, nearly always higher than rehabilitation. Although there may be environmental or structural reasons for taking a dam out of flood control service, this would be the exception, not the rule. Decommissioning results in negative net benefits because federal dollars would be spent which would ultimately create damages from flooding.

Rehabilitation

The cumulative effects of rehabilitating 2,097 flood control dams as they meet the requirements for rehabilitation, is continued flood control for at least 50 years, preferably 100 years. In 100 years from present, these structures will have trapped nearly 1.3 billion tons of sediment. This is sediment that would otherwise move downstream, impairing water quality, impacting municipal water supply storage, reducing flood storage capabilities and electrical power generation of major dams located on rivers across Oklahoma, and negatively impacting the fishing industry. These dams, and the local, state and national infrastructure and lands that they protect, represent a multi-billion dollar investment to preserve the quality of life enjoyed by the people of Oklahoma and its neighbors and visitors for the last 50 years.

Table D - SUMMARY AND COMPARISON OF ALTERNATIVES FOR SITE 12

Effects	No Action: No Federal Project Future Without Project: The Dam Fails	Decommissioning	Rehabilitation
Measures: Structural Nonstructural Land Treatment	Floodwater retarding structure No. 12 deteriorates over time with resultant catastrophic failure	Controlled breach of floodwater retarding structure No.12; installation of drop structure	Rehabilitate floodwater retarding structure No.12; erosion control; implement floodplain zoning ordinances
Project Investment	\$0	\$221,600	\$169,200
National Economic Development Account			
Beneficial Annual		\$3,000	\$28,800
Adverse Annual		\$13,600	\$10,400
Net Beneficial		(\$10,600)	\$18,300
Estimated net OM&R expenditures		\$400	\$400
Environmental Quality Account			
Land Use and management	Protect floodplain fields from flooding until dam breaches	Return floodplain fields to annual flooding	Protect floodplain fields from flooding for 100 more years
Prime Farmland	Loss of 40 acres	Loss of 40 acres	Continue to protect 40 acres
Erosion and Sedimentation	154,000 tons sediment deposited in channel and downstream w/catastrophic breach	Return to pre-project levels of erosion/sed. associated with flooding. No longer trap 2,880 tons of sediment per year.	Trap 288,000 tons of sediment
Streams & Lakes	Loss of 12.5 acres of pond	Loss of 12.5 acres of pond	Maintain for 100 years
Water Quality	Decreased due to sediment	Decreased due to sediment	Improved: fenced sed. pool
Fish & Wildlife Habitat	Loss of 12.5 acres aquatic habitat	Mitigated loss of 12.5 acres of aquatic habitat	Enhance habitat for 100 years due to fenced sediment pool
Wetlands	Loss of 12.5 acres	Mitigated loss of 12.5 acres	Enhance habitat for 100 years due to fenced sediment pool
Threatened and Endangered Species	Potentially adverse to interior least tern, whooping crane, bald eagle	Potentially adverse to whooping crane, bald eagle	Continue to provide habitat for interior least tern, bald eagle, whooping crane
Other Social Effects Account			
Human Health & Safety	Adverse: impaired access to medical/emergency services	Adverse: impaired access to medical/emergency services.	Positive: Continued access to medical/emergency services. Implement floodplain zoning
Transportation	Adverse: lost access to towns, schools, shopping, work	Adverse: lost access to towns, schools, shopping, work	Positive: protect transportation routes for another 100 years
Archaeological & Historical Resources	Adverse: high potential for previously unrecorded sites	Adverse: high potential for previously unrecorded sites	Positive: Protection and ID of previously unrecorded sites
Flood Damage Reduction	Loss of flood control. \$143,800 breach flood damage. (One-time loss of Function: \$49,400)	Loss of flood control. Prevent \$143,800 breach flood damages.	Maintain flood control for 100 years. Prevent \$143,800 breach flood damages.
Average Annual Flood Damages	\$31,000	\$28,600	\$2,200
Person-years of local jobs during construction		5.1	6.0
In-state Economic Output (Sales) during construction		\$375,300	\$439,060
Recreation	Incidental loss	Incidental loss	Incidental for 100 yrs
Regional Economic Development Account			
Positive RED Effect, Annualized			
Beckham and Roger Mills Counties		\$16,790	\$53,250
Rest of Oklahoma		\$3,890	\$10,250
Rest of Nation		\$0	\$0
Negative RED Effects, Annualized			
Beckham and Roger Mills Counties		\$4,770	\$3,640
Rest of Oklahoma		\$0	\$0
Rest of Nation		\$26,470	\$43,660

Table E - SUMMARY AND COMPARISON OF ALTERNATIVES FOR SITE 17A

Effects	No Action: No Federal Project Future Without Project: The Dam Fails	Decommissioning	Rehabilitation
Measures: Structural Nonstructural Land Treatment	Floodwater retarding structure No. 17A deteriorates over time with resultant catastrophic failure	Controlled breach of floodwater retarding structure No. 17A; installation of drop structure; relocation of mobile home	Rehabilitate floodwater retarding structure No. 17A; erosion control; relocate mobile home; implement floodplain zoning ordinances
Project Investment	\$0	\$173,850	\$237,700
National Economic Development Account			
Beneficial Annual		\$2,800	\$18,100
Adverse Annual		\$10,700	\$14,600
Net Beneficial		(\$7,900)	\$3,500
Estimated net OM&R		\$400	\$400
Environmental Quality Account			
Land Use and Management	Protect floodplain fields from flooding until dam breach	Return floodplain fields to annual flooding	Protect floodplain fields from flooding for 100 more years
Prime Farmland	Loss of 22 acres	Loss of 22 acres	Protect 22 acres
Erosion and Sedimentation	135,500 tons sediment deposited in channel and downstream w/catastrophic breaches	Return to pre-project levels of erosion/sediment associated with flooding. No longer trap 3,155 tons sediment per year.	Trap 315,600 tons of sediment.
Streams & Lakes	Loss of 6.8 acres of pool	Loss of 6.8 acres of pool	Maintain pool for 100 years
Water Quality	Decreased due to sediment	Decreased due to sediment	Improved: fenced sed. pool
Fish & Wildlife Habitat	Loss of 6.8 acres of aquatic habitat	Mitigated loss of 6.8 acres of aquatic habitat	Enhance habitat for 100 years due to fenced sediment pool
Wetlands	Loss of 6.8 acres	Mitigated loss of 6.8 acres	Enhance habitat for 100 years due to fenced sediment pool
Threatened and Endangered Species	Potentially adverse to interior least tern, whooping crane, bald eagle	Potentially adverse to whooping crane, bald eagle	Continue to provide habitat for interior least tern, bald eagle, whooping crane
Other Social Effects Account			
Human Health & Safety	Adverse: Potential for loss of life; impaired access to medical/emergency services	Adverse: impaired access to medical/emergency services.	Positive: Continued access to medical/emergency services. Implement floodplain zoning
Transportation	Adverse: lost access to towns, schools, shopping, work	Adverse: lost access to towns, schools, shopping, work	Positive: protect transportation routes for another 100 years
Archaeological & Historical Resources	Adverse: high potential for previously unrecorded sites	Adverse: high potential for previously unrecorded sites	Positive: Protection and ID of unrecorded sites
Flood Damage Reduction	Loss of flood control. \$162,000 breach flood damage. (One-time loss of function: \$45,600)	Loss of flood control. Prevent \$162,000 in breach flood damages.	Maintain flood control for 100 years. Prevent \$162,000 in breach flood damages.
Average Annual Flood Damages	\$19,400	\$14,100	\$1,300
Person-years of jobs during construction		5.9	8.1
In-state Economic Output (Sales) during construction		\$518,700	\$591,830
Recreation	Incidental loss	Incidental loss	Incidental for 100 yrs
Regional Economic Development Account			
Positive RED Effects, Annualized			
Beckham and Roger Mills Counties		\$14,890	\$40,380
Rest of Oklahoma		\$2,960	\$8,990
Rest of Nation		\$0	\$0
Negative RED Effects, Annualized			
Beckham and Roger Mills Counties		\$3,740	\$5,600
Rest of Oklahoma		\$0	\$0
Rest of Nation		\$23,870	\$40,140

Table F - SUMMARY AND COMPARISON OF ALTERNATIVES FOR SITES 12 and 17A COMBINED

Effects	No Action: No Federal Project Future Without Project: The Dam Fails	Decommissioning	Rehabilitation NED Alternative
Measures: Structural Nonstructural Land Treatment	Floodwater retarding structures No. 12 & 17A deteriorate over time with resultant catastrophic failures	Controlled breach of floodwater retarding structures No. 12 & 17A; installation of drop structures; relocation of mobile home	Rehabilitate floodwater retarding structures No. 12 & 17A; erosion control; relocate mobile home; implement floodplain zoning ordinances
Project Investment	\$0	\$395,450	\$406,900
National Economic Development Account			
Beneficial Annual		\$5,800	\$46,800
Adverse Annual		\$24,300	\$25,000
Net Beneficial		(\$18,500)	\$21,800
Estimated net OM&R		\$800	\$800
Environmental Quality Account			
Land Use	Protect floodplain fields from flooding until dam breach	Return floodplain fields to annual flooding	Protect floodplain fields from flooding for 100 more years
Prime Farmland	Loss of 62 acres	Loss of 62 acres	Protect 62 acres
Erosion and Sedimentation	289,500 tons sediment deposited in channel and downstream w/catastrophic breaches	Return to pre-project levels of erosion/sediment associated with flooding. No longer trap over 6,000 tons sediment/year.	Trap over 600,000 tons of sediment.
Streams & Lakes	Loss of 19.3 acres of pools	Loss of 19.3 acres of pools	Maintain pools for 100 years
Water Quality	Decreased due to sediment	Decreased due to sediment	Improved: fenced sed. pools
Fish & Wildlife Habitat	Loss of 19.3 acres of aquatic habitat	Mitigated loss of 19.3 acres of aquatic habitat	Enhance habitat for 100 years due to fenced sediment pools
Wetlands	Loss of 19.3 acres	Mitigated loss of 19.3 acres	Enhance habitat for 100 years due to fenced sediment pools
Threatened and Endangered Species	Potentially adverse to interior least tern, whooping crane, bald eagle	Potentially adverse to whooping crane, bald eagle	Continue to provide habitat for interior least tern, bald eagle, whooping crane
Other Social Effects Account			
Human Health & Safety	Adverse: Potential for loss of life; impaired access to medical/emergency services	Adverse: impaired access to medical/emergency services. Eliminate risk of loss of life.	Positive: Continued access to medical/emergency services. Implement floodplain zoning
Transportation	Adverse: lost access to towns, schools, shopping, work	Adverse: lost access to towns, schools, shopping, work	Positive: protect transportation routes for another 100 years
Archaeological & Historical Resources	Adverse: high potential for previously unrecorded sites	Adverse: high potential for previously unrecorded sites	Positive: Protection and ID of previously unrecorded sites
Flood Damage Reduction	Loss of flood control. \$288,000 damage if both dams breach. (One- time loss of function: \$95,000)	Loss of flood control. Prevent \$288,000 in breach flood damages.	Maintain flood control for 100 years. Prevent \$288,000 in breach flood damages.
Average Annual Flood Damages	\$50,400	\$37,500	\$3,500
Person-years of jobs during construction		12.2	14.1
In-state Economic Output (Sales) during construction		\$894,000	\$1,030,890
Recreation	Incidental loss	Incidental loss	Incidental for 100 yrs
Regional Economic Development Account			
Positive RED Effects, Annualized			
Beckham and Roger Mills Counties		\$31,680	\$93,630
Rest of Oklahoma		\$6,850	\$19,240
Rest of Nation		\$0	\$0
Negative RED Effects, Annualized			
Beckham and Roger Mills Counties		\$8,510	\$9,240
Rest of Oklahoma		\$0	\$0
Rest of Nation		\$50,340	\$83,800

RISK AND UNCERTAINTY

Engineering

The costs for rehabilitation of FWRS Nos. 12 and 17A are based on minimal survey data. These costs will not vary significantly during actual construction. All cost and structural data are based on an additional 100 years of life. Failure of the present dams would most likely occur due to deterioration and failure of the principal spillway conduits and/or breach of the embankments caused by failure of the auxiliary spillways due to loss of detention storage. However, sufficient data is not available to perform a defensible probability analysis for risk/time of dam failure. This, and the uncertainty of the sponsor's future actions on operation, maintenance, and repair has led to an analysis that best protects life, property, and the environment.

Economics

This rehabilitation plan uses a number of new approaches to the economic analysis not used previously in NRCS economics. There has been no prior watershed plan done under the rules of the Public Law 106-472, the Small Watershed Rehabilitation Amendments of 2000.

The Sandstone Creek watershed has not seen major flooding for the 50 years that the project has been in place. Thus the data used in the original 1950 plan based on historic flooding is in many ways better than any currently available data. The procedures used in the 1950 study are similar to those used for new planning today. The time and resources used in the original 1950 study are greater than those available today. So the data in the 1950 study was reused as much as possible. The average annual flood and sediment damages from the 1950 study were indexed by the increase in Roger Mills county land values. Since whatever index is selected must cover a 50-year period, it must combine the effects of input and output price changes, land use changes, and productivity increases. The land value index was chosen over the other available indexes; hay prices, wheat prices, Agricultural Producer Prices Received Index, Consumer Price Index, and Engineering News Record (ENR) Construction Cost Index. The land value index includes the productive value of the land and includes price changes, land use changes, and productivity increases. Table G shows the range of indexes available and an estimate of the relative increase or decrease should another index be chosen.

Table G – Indexes

	Index in Producer Prices Received, 1990-92 base:	Wheat per bushel	Hay per Ton	Land Values	Increase in ENR Construction Costs Index	CPI, Consumer Price Index
1950 Avg. Ann.	38.65	\$2.05	20	\$ 29	510	24.1
May, 2001	108	2.60	100	\$ 416	6288	177.7
Index	2.79	1.27	5.0	14.34	12.33	7.37

Intensification benefits were calculated for the original plan in 1950. The intensification benefits did occur during the 1950s through the 1970s; not only was the floodplain mostly cropped, much of it was irrigated. Later, high-energy prices caused the landowners to discontinue irrigation, and low wheat prices caused the landowners to convert most of the cropland back to hay and

pasture land. But, should economic conditions favorably change in the future, more intensive use of the land would follow so long as the flood damage protection is maintained. Therefore, intensification benefits are maintained in the analysis.

Table H - Numbers Used In the Average Annual Damage Calculations

#	Type of Flood Damage Event	Site 12	Site 17A	Notes
1	Current Average Annual Damages with Current Dams	\$ 2,228	\$ 1,337	Based on Org. Plan
2	Average Annual Damages without Structures	\$ 23,456	\$ 14,074	Based on Org. Plan
3	Damages Occurring after Breach Flood Event	\$143,800	\$162,000	Not in NED Calculations
4	Damages Occurring after any Loss of Function Event	\$ 49,375	\$ 45,583	Included in #5
5	Average Annual Damages after Loss of Flood Control	\$ 26,487	\$ 16,872	Including #4
6	Average Annual Damages after Rehab	\$ 2,228	\$ 1,337	Same as #1
7	Average Annual Damages after Decommissioning	\$ 23,456	\$ 14,074	Not including #4
8	Intensification Benefits	\$ 4,403	\$ 2,642	Added to NED effects
9	Rehab Flood Reduction with Intensification Benefits	\$ 28,662	\$ 18,074	#5 - #1 + Ann. #4
10	Decomm. Flood Reduction with Intensification Benefits	\$ 2,608	\$ 2,798	#6 - #1 + Ann. #4
11	Average Annual Costs for Rehab Alternatives	\$ 10,400	\$ 14,600	Not including \$400 O&M
12	Average Annual Costs for Decommissioning	\$ 13,600	\$ 10,700	Not including \$400 O&M
13	Rehab Net NED Benefits (assume no future dam)	\$ 18,262	\$ 3,482	#9 - #11
14	Decommissioning Net NED Benefits (no future dam)	\$ (10,970)	\$ (10,760)	#10 - 12
15	FY2002 Federal Discount Rate	6.125%	6.125%	

The damages for the breach flood are based on the local items to be damaged, pre-1950 sediment deposition damages, and estimates based on other catastrophic high velocity, high sediment load flood events, and an estimated 34¢ damage per ton of sediment. There has not been a catastrophic breach of any of the 2,097 NRCS watershed dams in Oklahoma on which to base these damages. The estimates assumed that a catastrophic dam breach would occur with the flood detention pool filled between the auxiliary spillway and the top-of-dam. The breach would immediately release all of the stored water in the flood pool and carry with it much of the dam embankment and stored sediment. About 486 acres for site 12 and 203 acres for site 17A would be severely affected by either scouring or sediment deposition from the flood event before most of the flow moves back into the main channel. Land damages were estimated based on the sediment deposition damages in each drainage area in the 1950 plan. Damages from a breach of site 17A were estimated higher in both the 1950-work plan and by the current planning staff because of the narrower valley and smaller channel. The breach flood damages are excluded from the average annual damage calculations.

**Table I – Single Event Flood Damages
Costs of a Breach Flood Event and Costs Following Loss of Flood Control**

Estimated Damages	Breach Flood Event		Loss of Flood Control	
	Site 12	Site 17A	Site 12	Site 17A
Agricultural Damage for acres 'wasted'	\$42,200	\$49,400		
Headcut Repairs * \$4,000 each	\$40,000	\$24,000	\$40,000	\$24,000
Vegetate Structure and Pool	\$6,900	\$4,400	\$6,900	\$4,400
Livestock Watering Facility	\$2,500	\$2,500	\$2,500	\$2,500
Sedimentation	\$52,200	\$46,000		
Mobile Home		\$10,000		
Repair Grade Stabilization Structure		\$10,000		
County Road Damage, 400'		\$1,000		
Raise Road to prevent post-breach flooding		\$14,700		\$14,700
Total Estimate One Time Damages	\$143,800	\$162,000	\$49,400	\$45,600

Costs following Loss of Flood Control

Some of these damages/repairs would occur following any long-term loss of flood control from these structures. Should either structure fail, the local land owner would have to provide livestock watering facilities and repair gully headcuts that would advance through the sediment pool. The road below site 17A would have to be raised to allow a larger diameter culvert. These damages would occur in the economic analysis following loss of flood control functionality due to any cause, and would require local funding for repairs/replacement. These costs are already built into the decommissioning construction costs.

Sensitivity Analysis of Date for Loss of No-Action Flood Control

As stated in the preceding Engineering section, “sufficient data nor engineering procedures are not available to perform a defensible probability analysis for risk/time of dam failure.” Actual flood damages are correctly calculated for the rehabilitation and the decommissioning alternatives. But estimating flood damage reduction benefits depends on the baseline no-action alternative, and WE DON’T KNOW when these dams might fail. Because the likely future condition of these dams is indeterminate and the dams already fail to meet current safety and performance standards, the simplifying assumption was used to evaluate the no-action alternative “as though the dam was not there”. Thus the economic calculations were based on the current dams not being there for the entire 100-year evaluation period, plus the front-end costs following any loss of flood control. A compelling argument could be made that the dams will continue to provide benefits for some time into the future. Given this great uncertainty, the following sensitivity analysis was included providing benefits and costs for each action alternative assuming the current dams fails in year 1, year 100, or any point between. This analysis also allows determination of a break-even year, a future year where the net NED benefits fall below \$0. Thus, if the decision-maker thinks that the dam will fail sooner than that date, NED benefits are positive; if the dam fails later than that date, NED benefits are negative. For both Sandstone Creek sites 12 and 17A, this analysis shows that regardless of the dam failure date assumption, the rehabilitation alternative has higher net NED benefits than the decommissioning alternative, and thus the rehabilitation alternative is the NED alternative that maximizes net NED benefits.

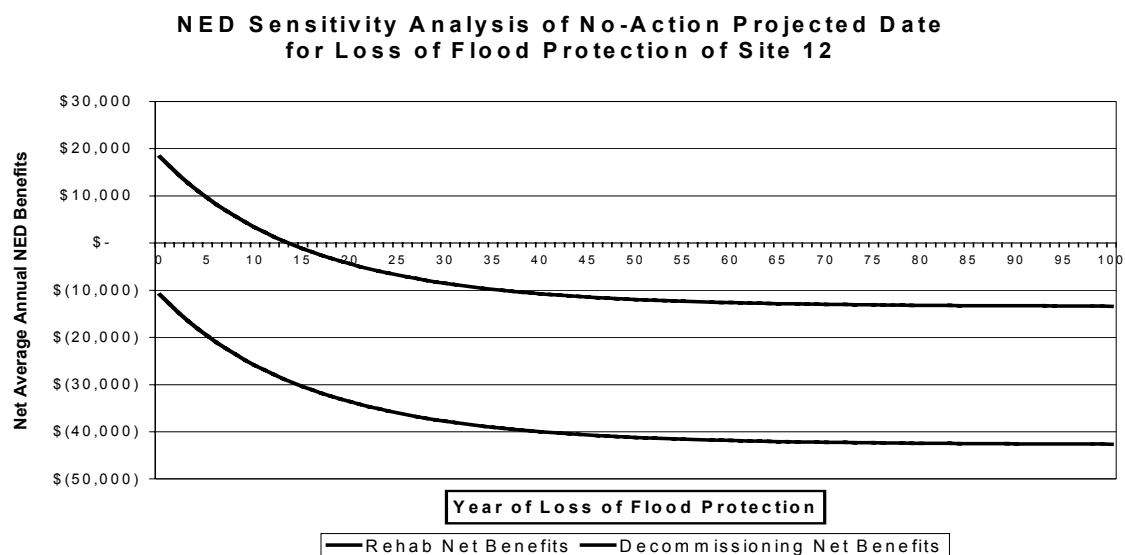
Net NED Benefits for Site 12

Table J shows the calculation of net NED benefits for site 12 assuming immediate loss of function of the current site 12, as opposed to assuming that site 12 functions fine for the next 100 years. Both extremes are improbable, the reality is somewhere in the middle.

**Table J - National Economic Development Account Summary Site 12
Showing both extremes of the sensitivity analysis**

Alternative	Average Annual			Rehab minus Decomm ission	Benefit/ Costs Ratio
	Benefits	Costs	Net Benefit		
Baseline assumes no current dam					
Rehabilitation of site 12	\$28,662	\$10,400	\$18,262	\$28,831	2.76
Decommission of site 12	\$3,030	\$13,600	(\$10,570)		0.22
Baseline assumes current dam functions 100 more years					
Rehabilitation of site 12	\$0	\$10,400	(\$10,400)	\$28,831	
Decommission of site 12	(\$25,631)	\$13,600	(\$39,231)		

The following graph shows the net NED benefits for any no-action date of loss of flood control from Site 12, from year 1 to year 100. Note that at any projected year of dam failure, the rehabilitation alternative produces average annual benefits of \$29,200 greater than the decommission alternative. The rehabilitation alternative produces positive NED benefits relative to the no-action baseline unless the current dam maintains functionality past year 17. Thus, if one were to assume the current dam would lose functionality on or before year 17, the rehabilitation alternative would generate positive net NED benefits.



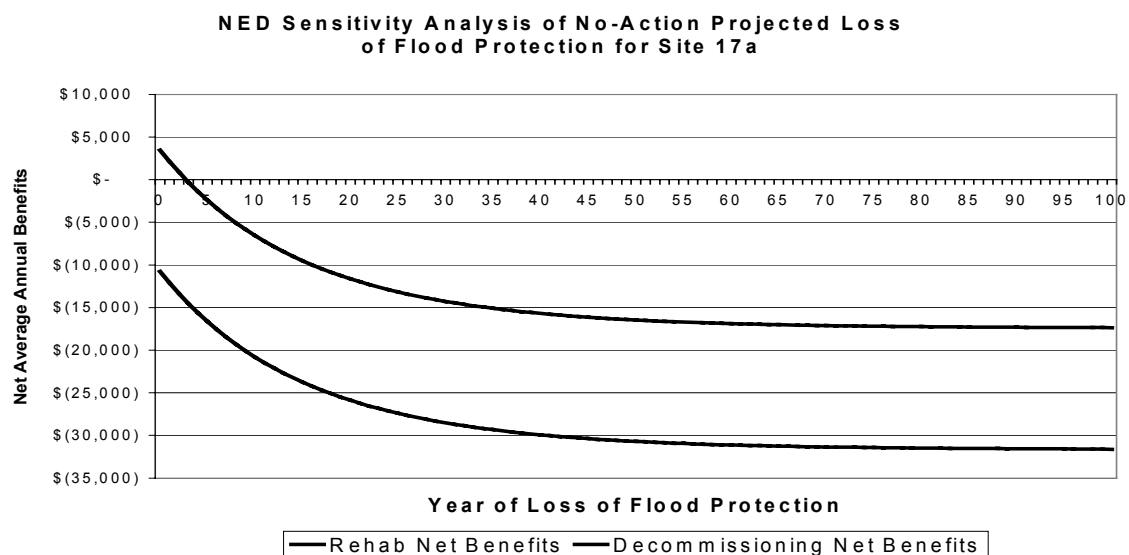
Net NED Benefits for Site 17A

Table K shows the calculation of net NED benefits for site 17A assuming immediate loss of function of the current site 17A, as opposed to assuming that site 17A functions fine for the next 100 years. Both extremes are improbable; the reality is somewhere in the middle.

**Table K - National Economic Development Account Summary Site 17A
Showing both extremes of the sensitivity analysis**

Alternative	Average Annual			Rehab minus Decomm ission	Benefit/ Costs Ratio
	Benefits	Costs	Net Benefit		
Baseline assumes no current dam					
Rehabilitation of site 17A	\$18,176	\$14,592	\$3,584	\$11,461	1.25
Decommission of site 17A	\$2,798	\$10,675	(\$7,877)		0.26
Baseline assumes current dam functions 100 more years					
Rehabilitation of site 17A	\$0	\$14,592	(\$14,592)	\$11,461	
Decommission of site 17A	(\$15,378)	\$10,675	(\$26,053)		

The following graph shows the net NED benefits for any no-action date of loss of flood control from Site 17A, from year 1 to year 100. Note that at any projected year of dam failure, the rehabilitation alternative produces net average annual benefits of \$11,500 greater than the decommission alternative. The rehabilitation alternative produces positive NED benefits relative to the no-action baseline unless the current dam maintains functionality past year 4. Thus, if one were to assume the current dam would lose functionality on or before year 4, the rehabilitation alternative would generate positive net NED benefits.



RATIONALE FOR PLAN SELECTION

From the federal perspective, the NED plan is the plan that maximizes net national economic benefits (required by P&G) while at the same time minimizes adverse environmental impacts (required by NEPA). Each alternative plan is to be formulated in consideration of four criteria: completeness, effectiveness, efficiency, and acceptability (P&G, P5d). After analyzing the alternatives, it was determined that rehabilitation of flood control dams No.12 and No.17A meets the purpose and needs statement, maximizes net benefits, and minimizes adverse environmental impacts. Neither the no action alternative nor the decommissioning alternative meets the sponsor's objective of continued flood control. Both would result in the resumption of, or increase in, flooding downstream of the dams. Both would have negative social, economic, and environmental impacts. Also, the no action alternative does not meet federal or state safety and engineering standards. Since the no action alternative is not acceptable to the sponsors, the public, or NRCS, the no action alternative was not selected. Therefore, the recommended plan is the NED plan, the rehabilitation of flood control dams No.12 and No.17A.

CONSULTATION AND PUBLIC PARTICIPATION

The Upper Washita Conservation District is the lead sponsor for planning the rehabilitation project for Sandstone Creek Watershed FWRS No.12 and No.17A. Informal meetings were held with the District during the fall months of 2000 to discuss potential candidate dams for rehabilitation and resource problems and opportunities in those watersheds. On January 2, 2001, the District formally requested rehabilitation planning assistance from NRCS. Monthly meetings were held with the District Board and landowners to discuss surveys, resource inventories, and planning and design alternatives. A formal meeting was held with the Board of County Commissioners for Roger Mills County to discuss floodplain zoning, particularly restrictions on development within the breach inundation area below a flood control dam. The Commissioners have authority under Title 82, Oklahoma Statutes 1980, to appoint a floodplain board to regulate land use within the 100-year floodplains, and they agreed to do so. A public meeting was held on May 1, 2001, in Cheyenne, Oklahoma to discuss the Rehabilitation Plan-Environmental Assessment of FWRS No.12 and No.17A. The meeting was well publicized in the local newspaper and landowners were notified by letter. In addition, many federal and state agencies, tribal governments, and other organizations were notified of the public meeting and afforded the opportunity to comment on the Rehabilitation Plan-EA.

The public meeting was attended by the NRCS Water Resources Staff, NRCS District Conservationist at the Cheyenne Field Office, board members of the Upper Washita Conservation District, County Commissioner, the National Park Service representing the Washita National Battlefield, and three landowners. All in attendance demonstrated enthusiasm for the rehabilitation project and voiced strong opinions about the benefits of the flood control program over the last 50 years.

Consultation has been made with the Oklahoma State Historic Preservation Office (SHPO) and the Oklahoma Archaeological Survey (OAS) on project measures contained in this rehabilitation plan. The Sandstone Creek Watershed Project was completed prior to the passage of the

National Historic Preservation Act of 1966. As a result, a cultural resources survey was not conducted in the project area at that time. In the interim, several cultural resources have been identified and recorded in the vicinity. One such cultural resource is listed on the National Register of Historic Places (#78002258). However, the archaeological site (34RM14) is well outside the project area and will not be impacted by any of the proposed actions. An Archaeologist with NRCS surveyed both project areas in April 2001 and no cultural resources were identified. The OAS has concurred with the findings in the survey report. The SHPO has concurred with the State Conservationist's decision that the project may proceed. The SHPO also concluded in 1998 that the FWRS are not eligible for the National Register. In the event of a discovery during construction, the site will be protected until it can be evaluated by a professional archaeologist in consultation with the SHPO and OAS. Consultation has also been made with the appropriate tribal representatives and no concerns have been identified.

A biological reconnaissance of the watersheds of both sites was made by the NRCS biologist. Consultation with the U.S. Fish and Wildlife Service, in accordance with Section 7 of the Endangered Species Act of 1973, was also conducted. Meetings were held on May 31, June 19, and August 10, 2001, with the U.S. Fish and Wildlife Service, Oklahoma Department of Wildlife Conservation, and the Wildlife Management Institute to discuss rehabilitation impacts on fish and wildlife habitat, riparian habitat, and wetlands. On August 9, 2001, a tour was conducted of two previously rehabilitated FWRS in the Sergeant Major Creek Watershed and of Sandstone Creek sites 12 and 17A. All parties agreed that the rehabilitation of FWRS 12 and 17A would not have significant negative effects on the environment. The NRCS, U.S. Fish and Wildlife Service, and the Oklahoma Department of Wildlife Conservation agreed to form an interagency team of technical specialists to evaluate all future rehabilitation projects early in the planning phase. A similar field tour was conducted on August 29, 2001 with the NRCS planning staff and personnel from the Tulsa, Oklahoma District of the U.S. Army Corps of Engineers (COE). At issue was 404 permitting for rehabilitation under NWP No.3 and potential environmental impacts of rehabilitation on the aquatic habitat. All issues raised by the COE were resolved and the COE agreed to develop a general permit for rehabilitation of flood control dams in Oklahoma.

The agencies and groups listed below were notified by letter of the public meeting held in Cheyenne, Oklahoma on May 1, 2001, and given the opportunity to comment on the Rehabilitation Plan-EA. Only the National Park Service had a representative at the meeting.

- Environmental Protection Agency, Region VI, 1445 Ross Avenue, Dallas, Texas 75202-2733
- U.S. Army Corps of Engineers, Tulsa District, P.O. Box 61, Tulsa, Oklahoma 74121-0061
- U.S. Fish and Wildlife Service, Ecological Services, 222 S. Houston, Suite A, Tulsa, Oklahoma 74127
- State Historic Preservation Office, Oklahoma Historical Society, 2704 Villa Prom, Shepherd Mall, Oklahoma City, Oklahoma 73107
- State Archaeologist, Oklahoma Archaeological Survey, 111 E. Chesapeake, Building 134, Norman, Oklahoma 73019-0575
- Farm Service Agency, 100 USDA, Suite 102, Stillwater, Oklahoma 74074
- U.S. Forest Service, Regional Office, 1720 Peachtree Road, NW, Atlanta, Georgia 30367-9102
- U.S. Forest Service, Rt. 1, Box 55-B, Cheyenne, Oklahoma 73628
- National Park Service, Washita National Battlefield, P.O. Box 890, Cheyenne, Oklahoma 73628
- U.S. Bureau of Reclamation, 4149 Highline Blvd., Suite 200, Oklahoma City, Oklahoma 73108
- U.S. Department of Interior, Bureau of Land Management, 221 N. Service Road, Moore, Oklahoma 73160
- Executive Director, Oklahoma Conservation Commission, 2800 N. Lincoln, Suite 160, Oklahoma City, Oklahoma 73105-4210
- Director, State of Oklahoma Water Resources Board, 3800 N. Classen Blvd., Oklahoma City, Oklahoma 73118
- Director, Oklahoma Department of Wildlife Conservation, 1801 N. Lincoln Blvd., Oklahoma City, Oklahoma 73105
- Honorable Frank Keating, Governor of Oklahoma, 212 State Capital Building, Oklahoma City, Oklahoma 73105
- Oklahoma Corporation Commission, Jim Thorpe Office Building, 2101 N. Lincoln Blvd., P.O. Box 52000-2000, Oklahoma City, Oklahoma 73152-2000
- Oklahoma Department of Environmental Quality, 1000 NE 10, Oklahoma City, Oklahoma 73117
- Oklahoma Department of Tourism and Recreation, 15 N. Robinson, Oklahoma City, Oklahoma 73105
- Oklahoma Department of Transportation, 200 NE 21, Oklahoma City, Oklahoma 73105
- Audubon Society of Central Oklahoma, P.O. Box 23591, Oklahoma City, Oklahoma 73123
- Sierra Club, Oklahoma Chapter, 419 NW 33rd, Oklahoma City, Oklahoma 73118
- Mr. James Pedro, Chairperson, Cheyenne-Arapaho Tribe
- Mr. Gary McAdams, Acting President, Wichita and Affiliated Tribes
- Mr. Johnny Wauqua, Chairperson, Comanche Tribe
- Mr. Billy Horse, Chairperson, Kiowa Tribe

RECOMMENDED PLAN⁵

Purpose and Summary

The purpose of this rehabilitation plan is to provide continued flood protection and reduce the risk of loss of human life. The structural integrity concerns of the two aging and deteriorating flood control dams, sites 12 and 17A, will be addressed and applicable safety and performance standards will be met.

The recommended plan consists of the rehabilitation of two existing single-purpose floodwater retarding structures (FWRS) and the installation of new erosion control measures (fencing) above the FWRS for sediment control, water quality improvement, and fish and wildlife and wetland habitat enhancement. Erosion control is an integral component of the planned sediment storage of the FWRS for the next 100 years. Also included is relocation of a dwelling and floodplain zoning to maintain the low hazard classification of the dams and reduce risk to loss of life. Total cost of the planned project is \$406,900. Table L displays a comparison of structural physical data for sites 12 and 17A.

Measures to be Installed

FWRS No.12 is a class “A” earthfill structure with a maximum fill height of 46 feet (unchanged from the existing embankment). The drainage area of the site is 862 acres, or 1.35 square miles. The volume of additional fill material required is 16,421 cubic yards, which includes backfilling of the principal spillway excavation. The surface area of the sediment pool is 13 acres, and the surface area of the detention pool is 30 acres. The principal spillway will be a standard open top concrete riser, with a concrete conduit. The auxiliary spillway will be vegetated earth. The structure will operate automatically, with floodwater temporarily stored in the detention pool and released at a controlled rate through the principal spillway. The principal spillway conduit has a diameter of 18 inches. Two gullies exist on the upstream side of the dam along or near each abutment. These areas will be reshaped and diversions will be installed above eroding areas to reduce future erosion and sediment to the structure. The sediment pool area will be fenced two feet above the 100-year sediment pool elevation and a restricted, gravel access ramp provided for livestock in order to reduce erosion and sediment, thereby improving water quality. Floodplain zoning ordinances will be adopted that prohibit future development in the floodplain in order to maintain the low hazard classification of the dam.

FWRS No. 17A is planned as a class “A” earthfill structure with a maximum fill height of 37 feet (an increase of 4.7 feet from the existing site). The drainage area of the site is 532 acres or 0.83 square miles. The volume of additional fill material required is 27,550 cubic yards, which includes backfilling of the principal spillway excavation. The 100-year sediment pool has a surface area of 16 acres and the detention pool has a surface area of 30 acres. The principal spillway will be a standard open top concrete riser, with a concrete conduit. Two low stage ports

⁵ This alternative is identified as the recommended plan in *Principles and Guidelines*, section 1.10.1 and in the *National Watershed Manual*, sections 504.38(g) and 504.40. This alternative is identified as the preferred alternative in the *CEQ regulations*, section 1502.14(e).

are included to reduce evaporation losses and provide enhanced wildlife habitat. The auxiliary spillway will be vegetated earth. The structure will operate automatically, with floodwater temporarily stored in the detention pool and released at a controlled rate through the principal spillway. The principal spillway conduit has a diameter of 18 inches. A freeze-proof tank will be added downstream of the site with a supply line through the dam to provide livestock water. The sediment pool area will be fenced two feet above the 100-year elevation to control livestock access, thereby reducing erosion and sedimentation and improving water quality. A mobile home is located immediately downstream of the dam and will be relocated in order to maintain the dam as a low-hazard structure. Floodplain zoning ordinances will be adopted to prohibit future development in the floodplain.

A livestock grazing management plan will be developed for both sites to allow “flash” grazing of the fenced areas that include the dams, auxiliary spillways, and areas between permanent water levels and two feet above the 100-year sediment pool elevations.

Table L - Comparison of Structural Physical Data

	As-Built	Existing	Recommended Plan
FWRS No. 12			
Elevation Top of Dam	1964.8	1964.8	1964.3
Elevation Auxiliary Spillway	1960.8	1961.3	1961.3
Elevation Principal Spillway	1946.8	1946.8	1946.8
Surface Area Detention Pool (acres)	29	30.5	30.5
Surface Area Sediment Pool (acres)	14	12.5	12.5
FWRS No. 17A			
Elevation Top of Dam	2006.9	2006.9	2011.6
Elevation Auxiliary Spillway	2002.9	2002.9	2008.6
Elevation Principal Spillway	1989.9	1989.9	1999.6
Elevation Intermediate Port			1993.4
Elevation Lower Port			1990.4
Surface Area Detention Pool (acres)	20.2	20	28.2
Surface Area Sediment Pool (acres)	9.2	6.8	15.9
Surface Area Intermediate port (acres)			9.8
Surface Area Lower Port (acres)			7.1

Costs

Estimated costs for installing the project are shown in Tables 1 and 2. Total annualized costs are shown in Table 4. The watershed agreement shows the actual cost sharing between Public Law 106-472 funds and other funds.

Installation and Financing

Structural measures will be installed during year one of the evaluation period.

The sponsors will be responsible for the installation of all structural measures. In carrying out this responsibility, the sponsors will:

- a. Secure all needed permits, easements, and rights for installation, operation, and maintenance.
- b. Make necessary modifications in roads, bridges, culverts, etc., to insure that flooding of roads will not be more frequent, deeper, or of longer duration than under existing conditions. The sponsors will work with the Roger Mills County Board of Commissioners to modify county roads as needed in compliance with 69 Oklahoma Statute 1971, Section 649.
- c. Provide local administrative services necessary for installation of the project.
- d. Execute an operation and maintenance agreement with NRCS for each structure.

The conservation districts have the power of eminent domain and will exercise their authority as needed to acquire the necessary land rights. The minimum land rights needed are defined as the 100 year - 24 hour reservoir or the emergency spillway crest, whichever is higher.

The sponsors will comply with the Uniform Relocation Assistance and Real Property Act of 1970 (Public Law 91-646, 84 State. 1984), effective January 2, 1971, and the regulations of the Secretary of Agriculture pursuant thereto in acquiring land rights.

The sponsors will adopt, administer, and enforce floodplain management regulations, under Title 82 of Oklahoma Statutes, 1980, for the purpose of prohibiting future development in the floodplains of sites 12 and 17A in order that this rehabilitation project is not rendered ineffective.

The sponsors will enter into a Memorandum of Understanding (MOU) with the NRCS, the primary goal of which is to establish a framework under which the sponsors may proceed with work on specific aspects of the proposed rehabilitation project. Accordingly, that specified work may then contribute towards the sponsor's 35 percent cost-share obligation.

Operation, Maintenance, and Repair

Measures in this plan will be operated and maintained by the sponsors with technical assistance from local, state, and federal agencies in accordance with their delegated authority. A specific operation and maintenance plan will be prepared for each structural measure utilizing the NRCS National Operation and Maintenance Manual.

Both structures will be operated and maintained by the Upper Washita Conservation District. The Oklahoma Water Resources Board will in compliance with limitations and regulations establish the storage and release of water in the sediment pools. An updated Operation and Maintenance Agreement will be executed for sites 12 and 17A prior to signing project

agreements. The agreement will detail specific responsibilities of the sponsors and include specific provisions for retention, use and disposal of property acquired or improved with PL 106-472 cost sharing. Provisions will be made for free access of district, state, and federal representatives to inspect all structural measures and their appurtenances at any time.

**Table 1 - Estimated Installation Cost
Sandstone Creek Watershed, Oklahoma
(Dollars) ^{1/}**

Installation Cost Item	Estimated Cost (Dollars)		Total
	PL-472 Funds	Other Funds	
<u>Structural Measures</u>			
Floodwater Retarding Structures 12	\$ 110,000	\$ 59,200	\$ 169,200
17A	154,500	83,200	237,700
Total project	\$ 264,500	\$ 142,400	\$ 406,900 ^{2/}

^{1/} Price base 2001

^{2/} Cost reduced to \$380,100 if both sites contracted together

**Table 2 – Estimated Cost Distribution – Structural Measures
Sandstone Creek Watershed, Oklahoma
(Dollars) ^{1/}**

Item	Total PL-472 Cost ^{2/}	Other Funds			Total Other Funds ^{4/}	Total Construction Cost	Total Project Costs ^{5/}
		Construction	Landrights ^{3/}	Project Admin			
Structural Measures Floodwater Retarding Structure Number							
12	\$ 110,000	\$ 48,300	\$ 10,600	\$ 300	\$ 59,200	\$ 158,300	\$ 169,200
17A	154,500	59,900	23,000	300	83,200	214,400	237,700
TOTAL	\$ 264,500	\$ 108,200	\$ 33,600	\$ 600	\$ 142,400	\$ 372,700	\$ 406,900

^{1/}

Price Base 2001

^{2/}

65 % of Total Project Cost, NTE 100 % of Construction Cost. NRCS technical assistance not included in total project cost.

^{3/}

Includes \$8,000 for relocation of Mobile home in Breach impact area below site 17A

^{4/}

35% of Total Project Cost

^{5/}

NRCS Technical assistance not included in total project cost

**Table 3 – Structural data
Dams with Planned Storage Capacity
Sandstone Creek Watershed, Oklahoma**

Item	Unit	Site Number		Total ^{3/}
		12	17A	
Class of Structure		A	A	
Seismic Zone		1	1	
Total Drainage Area Controlled	Sq. Mi.	1.35	0.83	71.00
Condition II Curve Number		86	86	
Time of Concentration	Hours	1.25	0.85	
Elevation, Top of Dam	Feet	1,964.3	2,011.6	
Elevation, Auxiliary Spillway Crest	Feet	1,961.3	2,008.6	
Elevation, Principal Spillway Crest	Feet	1,946.9	1,999.6	
Auxiliary Spillway Type		Veg	Veg	
Auxiliary Spillway Bottom Width	Feet	100	50	
Auxiliary Spillway Exit Slope	%	4.0	5.0	
Maximum Height of Dam	Feet	46.0	37.0	
Volume of Fill ^{4/}	Cu. Yards	81,700	56,700	2,353,161
Total Capacity ^{1/}	Ac. Feet	406	327	23,906
Sediment Submerged	Ac. Feet	111	130	6,291
Sediment Aerated ^{5/}	Ac. Feet	47	56	103
Floodwater Retarding	Ac. Feet	248	141	17,512
Surface Area				
Sediment Pool	Acres	13	16	704
Floodwater Retarding Pool	Acres	30	28	1,638
Principal Spillway Design				
Rainfall Volume, (1 day)	Inches	5.90	5.90	
Rainfall Volume, (10 day)	Inches	9.50	9.50	
Runoff Volume, (10, day)	Inches	6.11	6.29	
Capacity	CFS	32	34	
Dimension	Inches	18	18	
Conduit Type		RCP	RCP	
Frequency of Operation, Auxiliary Spillway	%	4	4	
Emergency Spillway Hydrograph				
Rainfall Volume	Inches	5.60	5.60	
Runoff Volume	Inches	4.03	4.03	
Storm Duration	Hours	6	6	
Velocity of Flow (Ve) ^{2/}	Feet/Sec.	4.34	4.21	
Maximum Surface Elevation	Feet	1,961.6	2,009.2	
Freeboard Hydrograph				
Rainfall Volume	Inches	8.23	8.23	
Runoff Volume	Inches	6.55	6.55	
Maximum Elevation	Feet	1,963.6	2,011.1	
Oe/b	Ac. Ft./Ft.	1.9	2.2	
Bulk Length	Feet	400	400	
Capacity				
Sediment	Inches	2.20	4.20	
Floodwater Retarding	Inches	3.45	3.18	

^{1/} Crest of Auxiliary Spillway

^{2/} Based on 25 % of maximum discharge during passage of the Freeboard Hydrograph (If greater than discharge of Auxiliary Spillway Hydrograph)

^{3/} Includes totals for Sandstone Creek Watershed plus Changes for this supplement.

^{4/} Includes original fill plus additional fill for rehabilitation

^{5/} Aerated Sediment not shown separately in original plan

**Table 4 - Estimated Average Annual NED Costs
Sandstone Creek Watershed, Oklahoma
(Dollars) ^{1/}**

Evaluation Unit	Project Outlays		Total Project Cost
	Amortization of installation cost	O&M Cost Not Included in Project Costs	
Floodwater Retarding Structures			
12	\$ 10,400	\$ 400	\$ 10,800
17A	14,600	\$ 400	\$ 15,000
Total	\$ 25,000	\$ 800	\$ 25,800

^{1/} Price base 2001, Amortized over 101 years using the FY2001 watershed discount rate of 6.125 %

^{2/} Operation, maintenance, and replacement costs of \$400 annually will be unchanged from the current and future No-Action OM&R costs of the current structures and netted out of the Net Benefits Calculation.

**Table 5 - Estimated Average Annual flood damage Reduction Benefits
Sandstone Creek Watershed, Oklahoma
(Dollars) ^{1/}**

Item	Site 12			Site 17a			Total		
	Without Project	With Project	Damage Reduction Benefits	Without Project	With Project	Damage Reduction Benefits	Without Project	With Project	Damage Reduction Benefits
Floodwater Damage									
Crop and Pasture	\$ 16,100	\$ 1,600	\$ 14,500	\$ 9,600	\$ 900	\$ 8,700	\$ 25,700	\$ 2,500	\$ 23,200
Flood Plain Scour	\$ 200		\$ 200	\$ 100		\$ 100	\$ 300		\$ 300
Stream Bank Cutting	\$ 900	\$ 100	\$ 800	\$ 500	\$ 100	\$ 400	\$ 1,400	\$ 200	\$ 1,200
Other Agricultural	\$ 1,600		\$ 1,600	\$ 900		\$ 900	\$ 2,500		\$ 2,500
Road and Bridge	\$ 400		\$ 400	\$ 200		\$ 200	\$ 600		\$ 600
Sediment Deposition	\$ 2,300	\$ 300	\$ 2,000	\$ 1,400	\$ 200	\$ 1,200	\$ 3,700	\$ 500	\$ 3,200
Sub-total	\$ 21,500	\$ 2,000	\$ 19,500	\$ 12,700	\$ 1,200	\$ 11,500	\$ 34,200	\$ 3,200	\$ 31,000
Indirect Damage	\$ 2,100	\$ 200	\$ 1,900	\$ 1,300	\$ 100	\$ 1,200	\$ 3,400	\$ 300	\$ 3,100
Intensification Related	\$ 4,400		\$ 4,400	\$ 2,600		\$ 2,600	\$ 7,000		\$ 7,000
Amortized one-time cost	\$ 3,000		\$ 3,000	\$ 2,800		\$ 2,800	\$ 5,800		\$ 5,800
Total	\$ 31,000	\$ 2,200	\$ 28,800	\$ 19,400	\$ 1,300	\$ 18,100	\$ 50,400	\$ 3,500	\$ 46,900

1/ Price base 2001

2/ All Damages are Agriculture related, which includes damage to rural communities

3/ Includes effects of required land treatment measures

4/ Costs and benefits for associated on-farm land treatment have netted out

5/ The Original 1949 Plan Intensification Benefits has already occurred and added to current flood damage estimates

6/ When the current structures stop providing flood control , the landowner and county will incur these one-time costs.

7/ The one-time costs were amortized for 100 years at a discount rate of 6.125%

8/ The Without Project damages assumes that the current dam losses function in the first year of the evaluation period.

The Without Project flood damages will be similar to the With Project flood damages until the dam fails.

NOTES for Calculations

	Present Condition	LT + Det. Storage
Floodwater Damage	0%	0%
Crop and Pasture	68%	72%
Flood Plain Scour	1%	1%

Stream Bank Cutting	4%	5%								
Other Agricultural	7%	0%								
Road and Bridge	2%	0%								
Sediment Deposition	10%	13%								
Sub-total	91%	91%								
Indirect Damage	9%	9%								
Total AA Damages	\$ 23,500	\$ 2,200	\$ 21,300	\$ 14,100	\$ 1,300	\$ 12,800	\$ 37,600	\$ 3,500	\$ 34,100	

**Table 6 - Comparison of NED Benefits and Costs
Sandstone Creek Watershed, Oklahoma
(Dollars) ^{1/}**

Evaluation Unit	Agriculture-related Damage Reduction	Average Annual Benefit	Average Annual Costs	Benefit Cost Ratio
Floodwater Retarding Structure 12	\$28,800	\$28,800	\$10,400	2.77
Floodwater Retarding Structure 17A	\$18,100	\$18,100	\$14,600	1.24
TOTAL	\$46,900	\$46,900	\$25,000	1.88

^{1/} Price Base 2001, Amortized for 101 years using the FY2001 watershed discount rate of 6.125%

^{2/} The original 1949 plan intensification benefits have already occurred and are in Table 5

^{3/} The benefits assumes that the current dam loses function in the first year of the evaluation period

^{4/} Operation, maintenance, and replacement costs of \$400 annually will be unchanged from the current And future No-Action OM&R costs of the current structures, and netted out of net benefits calculation.

Table M – LIST OF PREPARERS**NRCS Water Resources Staff**

Name	Current Position-years	Education	Experience-years
Billy R. Porter	Asst. State Conservationist for Water Resources - 4	B.S. Agricultural Economics	Economist –14 Soil Conservationist - 4
Bobby L. Tillman	Water Resources Coordinator-4	B.S. Geology	Petroleum Geologist-4 Sedimentation Geologist-11
Richard L. Lane	Planning Engineer – 12	B.S. Agricultural Engineering	Project Engineer –2 Area Engineer-7
Gary W. Utley	Hydraulic Engineer – 18	B.S. Agricultural Engineering	Resource Engineer - 2
Steven P. Elsener	Biologist – 23	B.S. Wildlife Ecology	Soil Conservationist-3
Tony Funderburk	Hydraulic Engineer – 6	B.S. Agricultural Engineering	Area Engineer – 2 Design Engineer – 4 Planning Engineer – 4 Civil Engineer – 3 Agricultural Engineer-6
K.C. Kraft	Archaeologist – 1	B.A. Anthropology M.A. Anthropology	Archaeologist - 15
Carol V. Crouch	Student Trainee/ Soil Conservationist – 2	B.S. Environmental Science	

Other NRCS Staff

B. Ted Kuntz	Agricultural Economist – 1 Programs Staff, Stillwater, OK	B.S. Ag. Education M.S. Economics	Agricultural Economist 37
Dale Pekar	Agricultural Economist – 2 NWMC, Little Rock, AR	B.A. Economics M.S. Economics	Agricultural Economist 24
David Buland	Economist – 5 Blackland Research Station, Temple, TX	B.A. Economics M.A. Theology M.A. Economics	Economist - 20

APPENDIX A

Letters and Oral Comments on Draft Rehabilitation Plan-EA

Public Meeting
May 1, 2001 7:00 PM
Ag Pavilion, Cheyenne, Oklahoma

Agenda

Sandstone Creek Watershed
Rehabilitation Plan-Environmental Assessment

Introductions.....Greg Allen, District Conservationist, Cheyenne Field Office
Plan Background.....Bob Tillman, Water Resources Coordinator, NRCS, Stillwater
Engineering.....Rick Lane, Planning Engineer, NRCS, Stillwater
Hydrology.....Gary Utley, Hydrologist, NRCS, Stillwater
Environment.....Steve Elsener, Biologist, NRCS, Stillwater
Archaeology.....K.C. Kraft, Archaeologist, NRCS, Stillwater

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- Q. E. Fowler – Has history shown that less storage is needed?
A. Sites 12 and 17A both have storage remaining in excess of the original 50-year storage estimate. Site 12 has about 100 years of remaining storage, which is the result in the original design to raise the dam height rather than excavate rock in the emergency spillway.
- Q. James Taylor – Where can you get dirt; is it worth building bigger?
A. The objective of the project sponsors is the continuation of flood control. The only way to achieve that objective is to rehabilitate the dams. If feasible, and in this case it is, we will build 100 years of sediment storage into the sites. Site 12 already has 100 years of sediment storage available. Site 17A has about 25 years of remaining storage so the dam will have to be raised to provide the additional needed storage. The fill material will be taken from a borrow area within and below the new permanent pool elevation.
- Q. James Taylor – What about the mobile home, who pays to have it moved?
A. Relocation of the mobile home to a location out of the breach impact area will be part of the total project costs paid by NRCS and the project sponsors. The landowner will not incur any costs for this relocation.
- Comment Clifford Williams – I am a big supporter of the PL-566 program. These flood control dams have significantly reduced flooding and they provide livestock and wildlife water. I am concerned about the county road being torn up during construction. The road needs to be maintained during and after construction.
- Q. James Taylor – Will the landowner, me, be contacted after the design is complete and before construction begins?
A. Once the preliminary engineering designs are complete, we will arrange an on-site meeting with you and the design engineers to discuss the proposed designs and address your needs and concerns.
- Q. Kurt Foote – What impacts will rehabilitation of these dams have on the Washita National Battlefield?
A. The rehabilitation of sites 12 and 17A will have no impact on this national historic site.
- Q. James Taylor – Can the trapped sediment be used as fill material to raise the dam?
A. If additional fill material is needed beyond what is available in the borrow area, some sediment may be used after it has been tested for pesticides, herbicides, etc. Probably sediment would be only be used after it was mixed with topsoil for the outer layer of the dam, which would be vegetated.
- Q. Nena Wells – If the dam is decommissioned, is the sponsor relieved of responsibility?
A. No. When a dam is decommissioned, a section of the embankment is removed and a drop structure is installed. The sponsors then have O&M responsibility for the drop structure.

APPENDIX B

Breach Inundation Maps for sites 12 and 17A

APPENDIX C

Watershed Project Map

